Disciplined Drawing

To Draw Without Guidelines

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Cade Sok

1st Edition

Disciplined Drawing

To Draw
Without
Guidelines

Cade Sok

The Disciplined Drawing Project:

Disciplined Drawing™ — Official Free Edition
Officially Published by @Kedokat (Discord)

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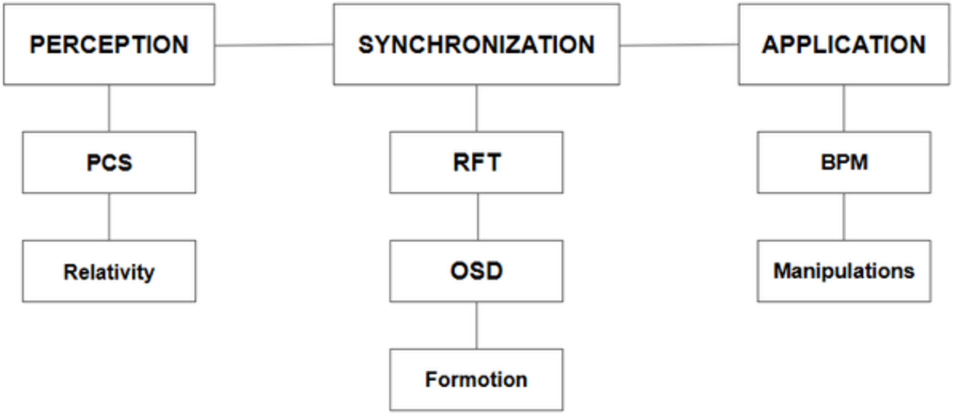
First Edition

“Where the spirit does not work with
the hand, there is no art”
-
Leonardo da Vinci

Disciplined Drawing:

To Draw Without Guidelines


PERCEPTION
SYNCHRONIZATION
APPLICATION
PCS
Relativity
RFT
OSD
Formotion
BPM
Manipulations

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Introduction

It was several years ago that I stumbled upon an art workshop to learn how to draw "professionally." I was 7 yrs old at the time, and prior to this I was learning to draw at home for fun, despite never being satisfied with my own art.

I couldn't draw "complex" forms like the human face. I figured I had to be doing something wrong, that I lacked proper technique.

My curious young self plopped into one of the chairs with a piece of paper and pencil provided. The instructor gave instructions and I simply waited for him to start drawing, so I could start copying.

He tells the whole audience that we will learn to draw a human head. Brilliant, I thought to myself. I had never been able to draw that before and I never tried to, fearing I would witness my own failures.

He draws guidelines of some circles and some lines. I trust the process and copy him. Then he draws the head's silhouette, the eyes, mouth, nose, he erases and voilà, he finishes. It looks perfect. I then look at my own drawing. It's a conflation of erasure marks and chicken-scratch that for some reason looked nothing like his.

I was mad and frustrated. Not because I had failed, but more so that I believed the world was telling me I was never meant to do art after all. Even when following the instructions of a pro, I couldn't draw what was right before my eyes.

What else was my naïve 7yr old self left to believe? I simply thought I did not have the "talent" to draw. And so for the next 11 yrs of my life I quit learning art altogether.

It wasn’t until I turned older that I began a personal self-improvement journey and decided to learn art again, but I was presented with the same method of guideline construction and drafting. I would practice for days, but progression felt slow. I did not feel a sense of deeper understanding or intuition to just draw from my imagination.

So one day, I experimented by forcing myself to draw without them, and for some reason learning to draw became more intuitive, and the progression of my art finally became evident.

It was not until I first learned to draw without guidelines that I began to understand how to draw with them. After much trial and error, I was able to derive **Disciplined Drawing**, an art theory applied through methodology that helps beginners learn to draw efficiently.

In a time where AI can generate images in seconds, many artists can feel demoralized from learning how to draw at all. But the real issue is that we were never given a faster and formalized way to learn drawing. That is the direct objective of the Disciplined Drawing art theory.

And contrary to what you may believe, Disciplined Drawing is not meant to be a replacement for guidelines, and neither is it a style to draw.

It's more specifically a training technique, and an accelerator for beginner artists to achieve faster and more confident line art solely, which is incidentally achieved through minimal guidelines usage — hence why part of the book title is, ”To draw without guidelines”.

Think of it like a supplementary theory to aid you on your journey in learning to draw, in addition to established fundamentals.

Disciplined Drawing treats line art as an isolated skill set, so you won't be learning shading or rendering techniques in this book. This is because being able to accurately draw the lines of a form is separate from learning to color and polish an existing drawing.

Drawing is to evoke the visuals of 3D objects with 2D lines. Shading is to evoke light physics and coloring is to evoke the color of light.

Attempting to learn drawing by integrating all three skill sets is like trying to learn to speak by learning to spell and learning to write an essay at the same time.

How can you learn to write if you haven't learned to speak first? If you cannot initially learn to draw a human accurately, why do you wish to shade and color it?

No amount of shading or coloring is going to make a flawed drawing look right unless you first learn to draw accurately what you see in front of you.

This is why Disciplined Drawing will only train you to become systematic and confident in line art creation, such that all other fundamentals and art theory can be applied with greater ease.

You aren’t guaranteed to master anatomy or be able to draw everything in 1 day, but it’ll enable you to achieve greater progress in being able to draw more confident line art. Before you dive deeper into the methodology, here are some things you should know.

There is one technique in this book we'll be using that requires access to any app that allows you to upload photos and adjust opacity (the degree to which an image is transparent).

The good news is that many phones, tablets, or even computers have free apps that offer these features. Other than that, tool-wise you can use whatever you want to draw, whether traditional or digital, as long as you can draw lines and erase mistakes.

Lastly, a lot of my examples in this book use anime style drawings for the reason that it is one of the most common art styles desired by independent artists today. However, in truth Disciplined Drawing can be applied to learning any art style you want.

After you have encapsulated the skill and instinct from applying Disciplined Drawing in your practice sessions, you're free to draw however you want, and use guidelines more effectively, empowered with the advantage of improved perception and speed of your drawings.

If you are like me who has practiced relentlessly only to end up with frustration of your own progress, then this book is for you.

In this book, you will learn how to apply Disciplined Drawing to draw more confidently and intuitively.

Chapter 1:
Why No Guidelines?

As mentioned in the introduction, the sole objective of **Disciplined Drawing** is to increase the speed and confidence of an artist's line art, which we will achieve by practicing to draw without guidelines.

Not that you're supposed to negate the use of guidelines entirely in your artistic processes, but only for your practice sessions dedicated to improving line art.

In this book, the term "practice sessions" refers to drawing for the sole purpose of training your line art speed and confidence.

It's the main task you'll be doing following the methodology of Disciplined Drawing and it's separate from "creative sessions," when you try to create finished pieces including coloring + shading.

For all practice sessions, it will be mandatory to use references for the objects you're attempting to learn to draw. You simply cannot draw what you haven't seen. It'd be like telling someone who's never seen the letter "A" to write the letter "A”. It's an impossible task to perform and yet many artists refuse the usage of references under the pretense that talented people don't need references to draw.

Whether you're talented or not, you will always need a reference to initially learn to draw what you want to draw.

Going back to what I was saying in the beginning, our objective is to help improve the confidence of our line art through less guidelines usage.

Why so? The truth is that you already know how to draw something confidently and intuitively almost everyday; the several dozens of words and sentences you write out on paper without even thinking.

In the beginning when you first learned to write as a child, the process may have been slow, and difficult. But overtime with consistent practice, you can write several sentences without much conscious thought.

This is achieved largely through the development of muscle memory to write. Muscle memory is the instinctive body movements that help accomplish daily tasks without even thinking.

They involve complex physical actions that many of the world’s top robotics engineers struggle to replicate perfectly. It's the only reason why you can brush your teeth, open doors, and write out hundreds of letters at incredible speeds. It's also why you’ll be able to draw confident line art.

The problem? While guidelines construction are helpful in maintaining structure and proportions in drawing, they don’t target muscle memory development beneficial to beginner artists.

Muscle memory forms most when three conditions are satisfied:

1. Motions are consistent (the same or similar motions are executed).

2. Motions are repeatable (motions can be executed again).

3. There is corrective feedback of motions (errors are easily visible and fixable).

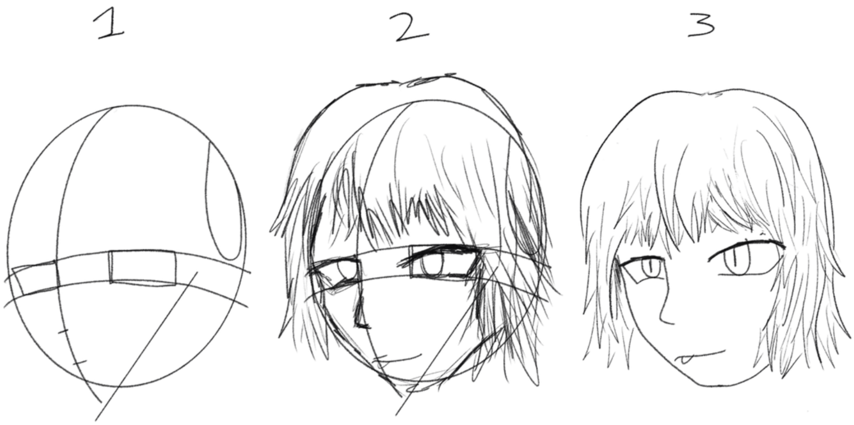
Learning to draw by first practicing with heavy guidelines usage can weaken all three conditions necessary to develop muscle memory:

1. Layered pre-sketches make motions variable = inconsistent motions.

2. Guidelines are repeated more than the final contour = less repetition of the actual image.

3. Several steps of abstraction and refinement = slower feedback on errors.

This is exactly why when you're first practicing to draw, you should be relying minimally on guidelines. To demonstrate this fully, take a look at the image of a human face drawn following common usage of guidelines. You can see how through steps of construction, drawn motions become inconsistent and unrepeatable. But the most detrimental aspect is the slower feedback of errors.

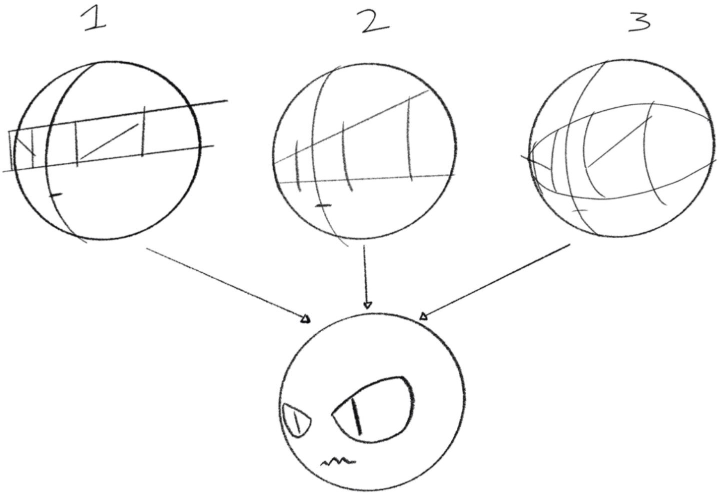


If you had to answer the question, “What and when did the artist make a mistake in this drawing?”, it could be attributed vaguely to any step.

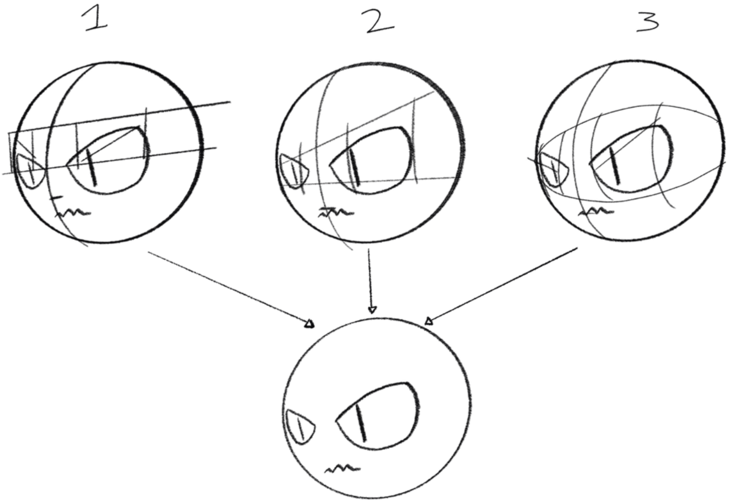
Was the mistake in the type of guidelines used in step 1? Was it my gradual refinement over the guidelines in step 2? Or was it the final contour I drew on top of everything that was wrong in step 3?

Not only are strokes more variable and harder to repeat, the issue with first practicing with guidelines is that mistakes are much harder to identify and correct accordingly.

Let’s also take a look at a much simpler face drawing. There are three different guidelines illustrated that may be used by beginner artists to draw the face. To beginners, they may all look carefully and accurately drawn.



The problem? All three actually possess incorrect positions that don't match the reference face exactly. If you attempt to match it directly, you can see how all of them are slightly off. Even with a simple doodle face, guidelines can still mask many unknown flaws for beginners.



Maybe for a doodle face, slight inaccuracies don't matter much. But the point is how many errors can be hidden even for a doodle that simple.

Now imagine how many more mistakes can go unnoticed when drawing more realistic faces?

The scary part is that beginners do this all the time: carefully constructing guidelines of their references and trusting them blindly, not knowing the many hidden mistakes they commit.

It is evident that early use of guidelines can make error feedback slower and more uncertain for beginner artists, since mistakes may be buried under abstract layers of scaffolds.

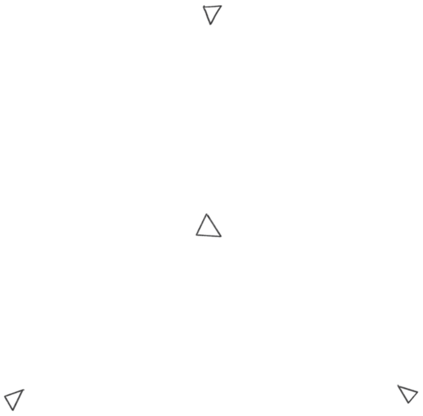
Hand-Eye Coordination:

A second issue with beginner artists relying first on guideline construction is the possible lack of emphasis on pure hand-eye coordination training.

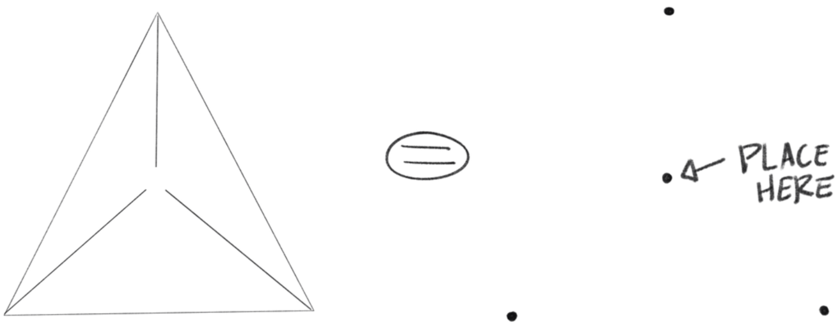
What does it even mean to train hand-eye coordination? How does one define it?

Hand-eye coordination is the ability to guide and control your hand motions based on what you see. If you first start learning to draw with guidelines, you could be diminishing the training of this significant skill. Let's say we have a triangle created by the positioning of smaller triangles.

Simple, but still clearly symmetrical and possessing defined proportions.

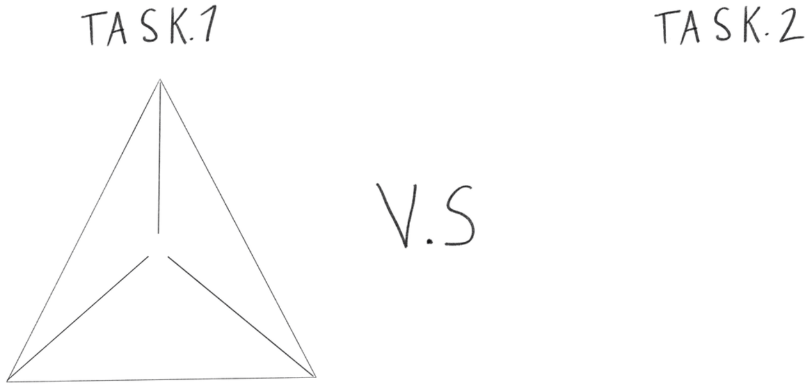


Even if beginners are given perfect guidelines to draw this shape (as seen in below image) because creating their own could be flawed, the issue is that you reach a point where all the coordination is done for you. It becomes similar to tracing or having someone tell you where to draw.



You're no longer training hand-eye coordination, but drawing based off a pre-made path. To most effectively train hand-eye coordination, you should attempt to just draw the symbol directly.

Try it yourself and feel the difference in cognitive execution. First imagine drawing the triangles on top of the guidelines of this page. Then attempt to redraw the triangles freehand, using a separate piece of paper without any guidelines.



By drawing it without guidelines, you're forced to calculate invisible proportions using just what you see in conjunction with the careful guidance of your hands.

This is how to most efficiently train hand-eye coordination: attempting to directly draw what's right in front of you with just your vision and hands against a blank canvas.

Instead of letting scaffolds guide your perception, you let perception itself guide your drawings.

Line Control:

You can argue that the lack of training in hand-eye coordination is only when you assume someone starts drawing with pre-made guidelines.

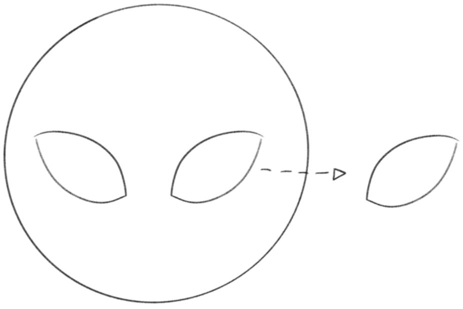
Assuming that a beginner manages to create perfect guidelines on their own, and setting aside the reasoning of slower error feedback with guidelines, why is it still less ideal to use guidelines early on when learning to draw?

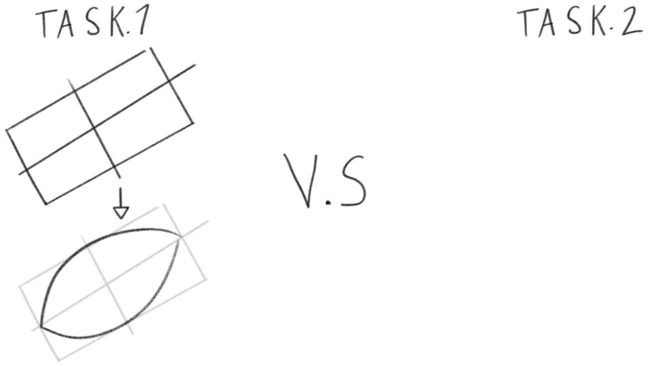
This is because beginners can still be misguided in the training of their own “line control”. Line control is the ability to draw exact lines as intended.

The issue is that the more guidelines to direct your motions, the more rigid and restricted your own hands could become.

For beginners who haven’t yet refined their line control, they may become more confused and stiffen their own hand motions when first drawing based off guideline construction.

You can try experimenting with this yourself by drawing the simple eye shape in the image below.





First attempt to draw it with the guideline measurements provided. Then in a second attempt, try to draw it directly without any guidelines.

Take note on how more intuitive and free your motions become in your second attempt. Even when guidelines accurately mark the proportions of an image, they do not accurately describe the human instincts of pressure, speed, and motion of one's hand necessary for drawing a line. That is something that is best trained directly.

So while many people can write confidently, they can’t draw confidently largely due to differences in how we choose to practice drawing with heavy guideline usage first.

Whilst guidelines can serve as a visual aid for proportions, they aren’t ideal for developing the fundamental components of muscle memory, hand-eye coordination, and line control for beginning artists. The solution for training and developing all three is a method familiar to us since elementary school.

One Stroke Doctrine:

Kim Jung Gi, arguably one of the strongest illustrators in history, was famous for drawing entire masterpieces without guidelines. His confidence and speed in drawing accurate line art were sought by many, but only very few people have been able to imitate his degree of efficiency to draw on command.

What's notable is he was never secretive about how he obtained his artistic ability. He once stated in a Proko interview that the key to his style was to try drawing what you wanted in a single stroke.

And in another interview with Visual Atelier 8 magazine, he was asked about his distinguishing ability to draw without guidelines. Kim replied that he had always drawn that way since childhood because he simply thought it was the ‘correct way to draw’.

His statements align closely with a concept I defined as the **One Stroke Doctrine (OSD)**: Every line you seek to draw must be created in one clean motion. No hesitant sketching or guideline usage whatsoever in your practice sessions. OSD explains why Kim Jung Gi’s strict way of drawing works so well.

Just directly attempting to draw contours head-on in one stroke. Of course, the difference is that OSD is only meant to be followed in your practice sessions of drawing, not to replace your entire style or strategy to make artistic pieces.

This isn’t saying to skip guidelines entirely, but rather the focus of OSD is training human intuition first before abstract construction.

This sounds impossible at first, and even stupid to try, but it’s the exact same way you learned to draw letters so confidently.

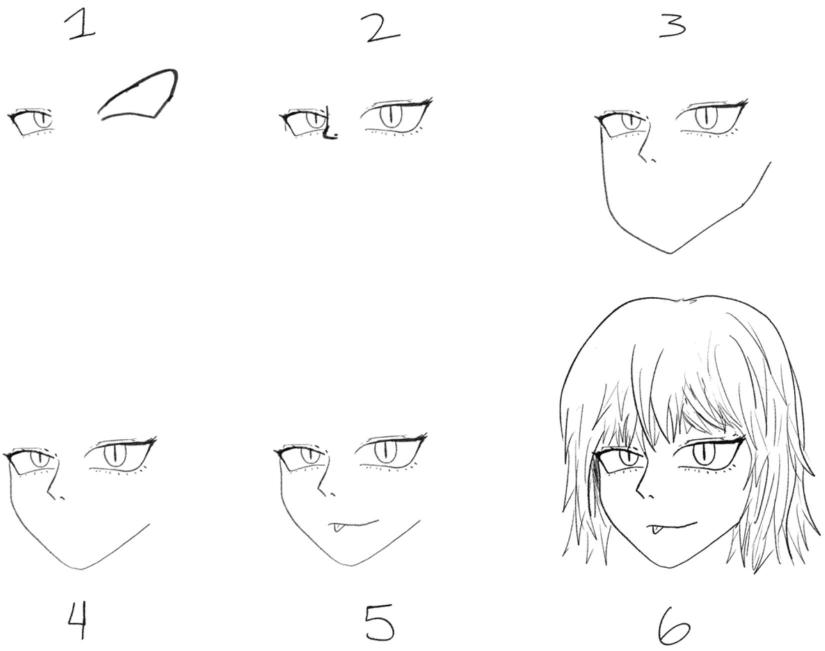
You were shown a letter, and you had to attempt to write it down in single strokes. It didn’t matter how many times you messed up as you just had to try again and again until you could write letters in one stroke.

This same strict practice and discipline is exactly what you’ll be applying in your practice sessions with OSD.

But why do we do this? It’s because the One Stroke Doctrine satisfies all three conditions of muscle memory development. Strokes become consistent, repeatable, and errors are much easier to identify.

This is in addition to directly training your hand-eye coordination and line control when you negate any guidelines usage in your practice sessions.

You can see this clearly in the next image of the same face earlier drawn following OSD.



Even if there are more mistakes, they're easier to identify, and corrections can be made accordingly. You know exactly when and what mistakes you make when drawing.

This makes error feedback much more immediate and efficient as a result. Hand-eye coordination and line control is also trained more intensively when you attempt to draw freehand what's right in font of you.

Practicing to draw may feel slower and frustrating at first with OSD due to the obvious amount of mistakes you'll be making, but that's the point.

Every mistake you acknowledge and correct is another step in improvement. Instead of hiding flaws behind layers of construction, you confront them head-on.

Even in the face of countless mistakes, you must aspire to practice drawing in a strict and self-correcting manner. That’s a part of the reason why the word *Disciplined* is part of Disciplined Drawing.

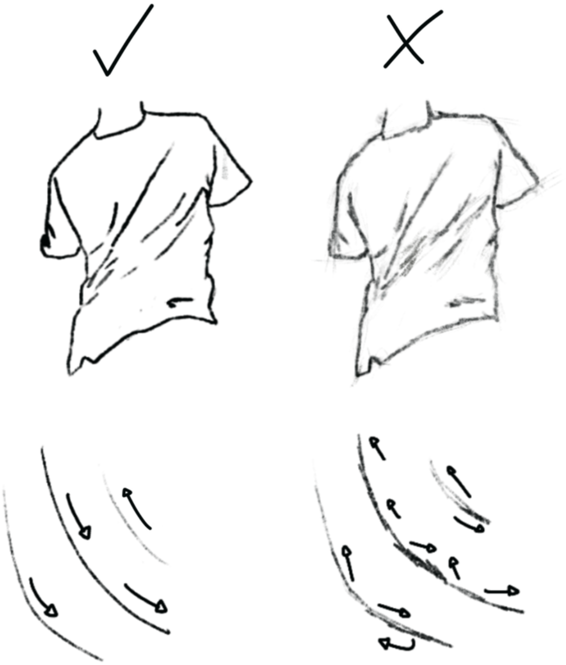
Not until you first practice drawing without guidelines can you comfortably draw with them. It’s why using hypothetical guidelines to write letters now wouldn’t hinder you at all because you already know how to write them in single strokes.

You’ve already fine-tuned your muscle memory, hand-eye coordination, and line control first. Intuition should predate abstraction.

Drawing in one stroke does not necessarily mean drawing in the darkest or bold lines for every contour you see. Line art sometimes involves the usage of bold lines, but in cases where contours are lighter values, (on clothing for example) it’s optimal to match those lighter values of lines.

OSD only mandates drawing in single motions to create any perceived line, regardless of its value (how light or dark it is). So long as you are drawing in single motions, the value of the stroke itself is not that important.

You also aren’t required to draw entire large contours in large single strokes. Remember, it's any perceived line you just have to draw in one stroke. You can always divide lines into smaller lines, and take more pauses between strokes just as long as its not random.



Note, that OSD is only a training technique. It's meant to help you develop more muscle memory of your drawings, train your perception and increase your confidence in making line art.

After you practice drawing with OSD, you can still draw however you want. That could mean drawing with careful guideline construction, light gestures, or even full chicken scratch, etc. If you notice you feel more confident, and your drawings become more intuitive, that's the direct effect of OSD training. When your confidence grows in being able to draw in single strokes, drawing in any style becomes easier.

Many people do not get past this stage, and give up after just one attempt at practicing with OSD. It's important that you remain consistent and committed to this strict practice if you want to see its benefits.

The learning curve is similar to developing the muscle memory to ride a bicycle. You failed repeatedly, and possibly even hurt yourself in the process. Even when results didn't seem obvious, as long as you kept at it, the body recalibrated overtime and motions became refined through trial and error. Not through flawless talent.

I actually discovered the effectiveness of OSD on accident. When I got frustrated with my own art progress and became impatient, I vowed to myself that if I couldn't draw anything, I'd at least want to be able to draw the skull.

That one day, I had spent several hours just trying to draw the skull directly. I recall, that I was on the verge of giving up after erasing hundreds of times.

I continued practicing for several days afterward, and before I realized it, I had been able to draw the skull instinctively, without much thought. My muscle memory finally developed.

This reminds me of artists who still integrate OSD into their creative sessions and continue to draw in single strokes. This is what I like to call the one-shot style.

Chapter 2:
The Definition of Drawing

What even is a drawing? A drawing can be defined as:

"Lines arranged in such a way as to evoke a visual."

You will be translating all the images you see into a set of lines to be drawn by hand. That's all drawings are, creating illusions of images with arranged lines.

So if a drawing is an arrangement of lines, then all we have to do is just copy the lines of our references we wish to create?

Not exactly. Yes, drawings are arrangements of lines, but that doesn't mean a random conglomeration of lines.

Otherwise, I would have said a drawing was a combination of lines. To combine is to mix things. To arrange is to organize things. Two different ideas. So what exactly are we arranging in a drawing besides just lines?

The PCS Variables:

There are only three things that you need to arrange in any drawing:

1.The **P**osition of elements.

2. The **C**ontour of elements.

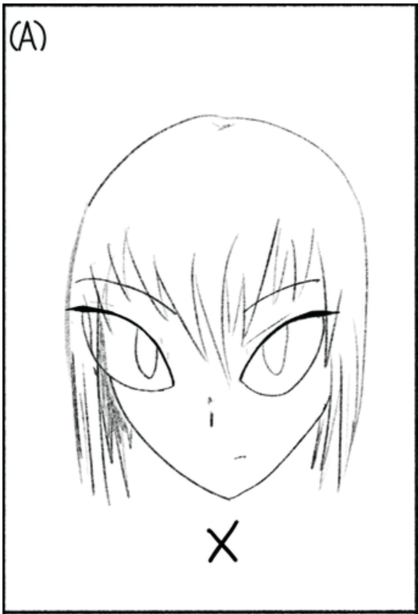
3. The **S**ize of elements.

Why did I use the term “elements”? Why not “line”, as in "the contour of lines"? Because the term “lines”, more so refers to single lines. The term “element” is an encompassing term that refers to any comprehensible part of an image as determined by you.

For example, this may include the eye of a face, half of a body, or even a single line. To accurately draw any reference, you must maintain the accuracy of only those three variables.

This is what I call the **PCS Variables**, where PCS is an abbreviation for Position, Contour, and Size. You can pronounce PCS like “pieces”.

The PCS are the interdependent building blocks you must perceive from images to accurately draw anything. You need to maintain the accuracy of all three variables simultaneously (position, contour and size of elements) for any drawing to look correct. I demonstrate this on the next page with an image of an anime face.


(A)
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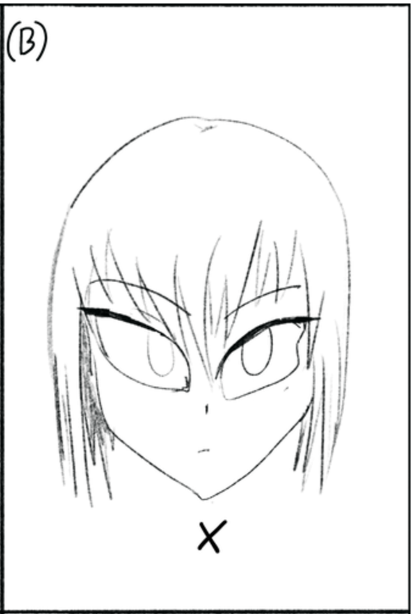
(B)
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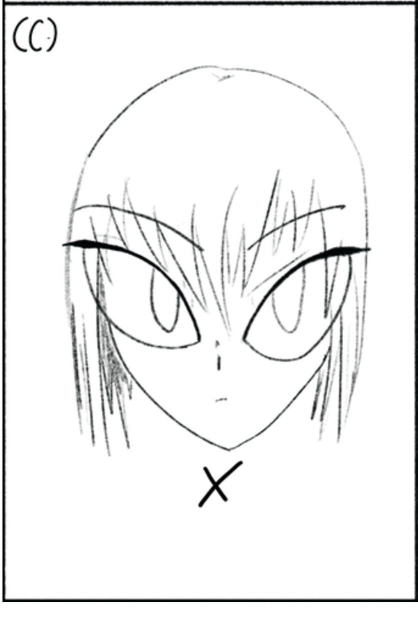
(C)
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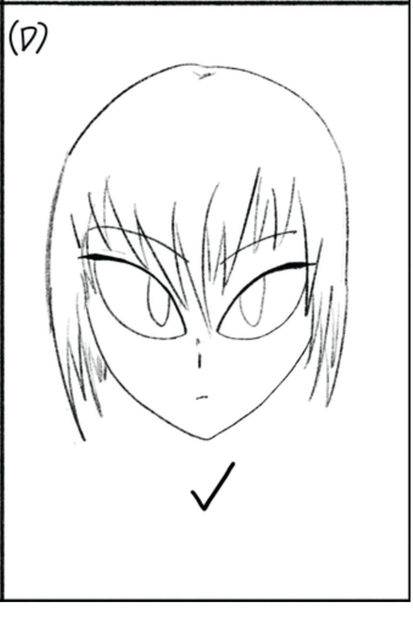

(D)
✓

In part (A), the contour of the facial elements (eyes, nose, mouth) is correct, but the position of the eyes and mouth is wrong.

In part (B), the position of the elements are correct, but the contours are wrong.

In part (C), the size of the elements (eyes) is wrong which also causes an error in position.

Only in part (D) when the position, contour, and size of all the facial elements are correct, is there an interpretable refined drawing of an anime face.

This demonstrates how all three PCS variables are necessary in order to accurately draw any given reference.

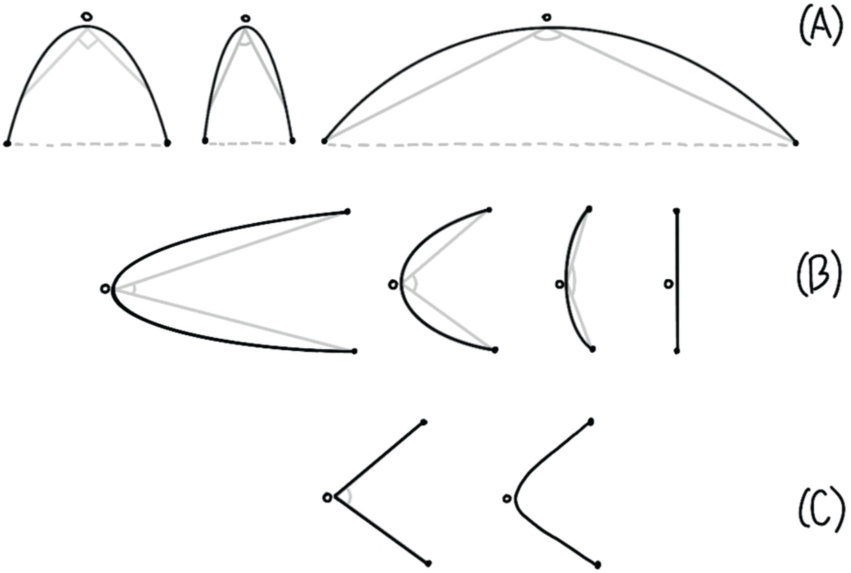
The term “contour” refers to any drawn line, which can differ by angle and curvature. Within the domain of Disciplined Drawing, they are defined as the following:

Angle = The degree to which a line bends

Curvature = The roundness/sharpness of line.

On the next page, you can see how a change in angle transforms a contour in parts (A) and (B).

In part (C) you can see two contours with the same angle but possessing different curvature, where one is more round and the other is more sharp.



The Negation of Talent:

The perception of the PCS variables is all you need to draw anything accurately. Not any special gifts like photographic memory, or even sight itself. Yes, you read that correct. You don't even need to see to draw. Only to *perceive*.

The exemplar of this is blind artist Eşref Armağan. He has been blind since birth, but grew a passion for drawing and painting despite not being able to see the world around him.

Still, Eşref doesn't just pick up a pencil and draw stuff he can't see by miracle. Eşref described his method as being done through touch and memory of object information.

While our input of references is through sight, he takes in input through sense of touch. Every line he draws, he is also touching.

In theory, his sense of touch substitutes for his absence of sight, and he could possibly be tracking three things: the position of elements, the contour of elements, and the size of elements. In other words, the PCS variables.

You can try this yourself, and attempt to draw by first touching objects with your eyes closed. Touching any object, you can perceive it's position in space relative to other elements, it's contour, and it's size.

Just based off those three variables, you can go ahead and attempt to draw objects without actually seeing them.

Simply acknowledging and being aware of the three fundamental PCS variables will allow you to perceive and analyze any reference there is to draw, irrespective of any notions of talent.

Formotion:

So far, I have emphasized the importance of drawing references repeatedly in order to learn to draw.

You have also learned that you’re supposed to draw references following OSD. But this strict manner of drawing in clean strokes actually makes duplicating references nearly impossible. To even recreate a single line in one motion can be a difficult task. To do the same for every line in an entire image? Not practical.

You may be thinking: how can we learn to draw from references, if drawing them exactly is not possible? Because the truth is that it isn't necessary to draw references exactly in order to learn to draw.

Traditional approaches to reference drawing place heavy emphasis on exact duplication of images. This trains visual logic intensively.

The issue is that it involves careful construction with a lengthy process of multi-step sketching. Muscle memory is harder to retain because it requires consistent motions with faster feedback loops.

Even with repeated reference copying, many artists ask the same question: Why can't I draw what I see in my head perfectly? Or why can't I draw what I see in my imagination?

It's because seeing things and knowing how to physically do things are two different things. That'd be like wondering why a baby can't walk right away seeing other humans walk. The brain doesn't work that way. The brain needs to perform physical actions before it can remember how to do physical actions.

The baby may try to walk and fail a hundred times before its brain can learn to actually walk from memory. In the same way, you need to repeatedly draw the same image and fail a hundred times before your brain learns to draw from memory. Repetition through trial and error is the key to developing your intuition to draw instinctively.

This is why we define a new type of drawing practice, **Formotioning**: Drawing to develop the muscle memory of a form, rather than just copying a form (and yes, practice sessions consist of Formotioning).

This is achieved through repeated reference drawing with OSD and retaining only the strokes that minimally imply the object you're drawing.

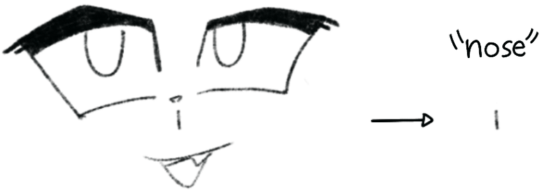
The purpose of repetition isn't to make pretty images, but to remember the motions that make images. In other words, Formotioning trains muscle memory of objects to redraw them on command.

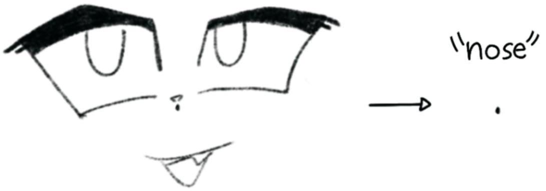
From this view, we treat references as training data, not photographs to recapture. Instead of repeated construction to produce perfection, we emphasize repeated motion to produce intuition.

With Formotion practice, the key is that you aren't trying to achieve duplication, but minimal evocation. To understand the simple truth:

You don't need to draw 100% correct in order for your drawings to look 100% correct.

A good example of this is the stylization of anime faces. They are viewed to have a nose, eyes, and a mouth just like any normal human face. But if you isolate the elements, you'll come to realize many anime faces don't actually have an exact nose, but an evocation of it—a single dot or a line.





Drawing is not just about duplication, but making implications. A reminder that you are once again crafting illusions of forms, not constructing actual forms.

Continue drawing so long as you feel like nothing is wrong, even if you know your drawing looks different than the reference.

This way, even if 100% accuracy isn't possible, you still internalize the general correct motions to imply the object.

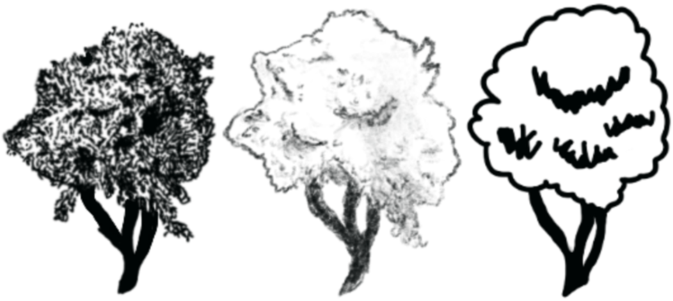
Note that Formotioning is not applied the same across all forms, and your approach will differ between two types of forms.

Objects with a fixed geometry generally have fixed contours. These are **Static Forms** and they require you to draw more closely to a reference's contours to imply them. This includes objects like a cube, skull, or a car.

Objects with an unfixed geometry generally have unfixed contours. These are **Variable Forms** and it is impractical to attempt to draw them line for line. This includes objects such as grass, hair, or clothing.

This also means Variable Forms are easily implied by learning to draw the patterns of its contours rather than the exact contours themselves.

How you choose to evoke a Variable Form through a pattern is dependent on your subjective judgment. You can see this with a reference of a tree evoked using different shading patterns through different art styles.



Thus you can Formotion either to remember the precise contours of a form (Static Forms), or the general patterns of a form (Variable Forms).

Chapter 3:
Spatial Intuitions

Learning to draw is more than just copying and correcting lines on paper. To perceive and analyze the 2D proportions of a drawing is only one part of the equation.

To draw from memory with the upmost confidence, you need to become aware of your “spatial intuition”. It’s the innate sense that enables you to perceive the 3D form of objects from sight alone. To be mentally aware of an object’s edges, curves and geometric surfaces.

Note that spatial intuition is separate from mental visualization. It’s the reason why you can recognize objects in your hand with your eyes closed. Photographic memory is not the key to drawing or understanding the 3D form of objects.

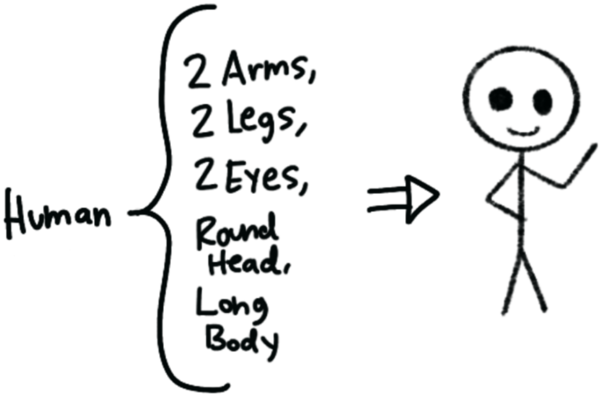
If people can still struggle to draw with a physical reference in front of them, how would a mental image help any better? Visual memory is fragile and unreliable for many people, so how can one definitively use it to remember their drawings?

An even more flawed strategy is to solely rely on the conceptual memory of objects. This is most evident in beginner artists' first attempts at drawing. While mental facts are easier to recall than mental imagery, it isn't directly applicable to the domain of drawing.

Let's demonstrate this clearly with the subject of the human body. First, answer this question with a list of words "What does a human figure look like?"

You might say, "two hands, two legs, two eyes, round head, and standing upright."

It's not a coincidence that when you look at beginner drawings, it mirrors that basic visual description of humans as well. This is the origin of the stickman.

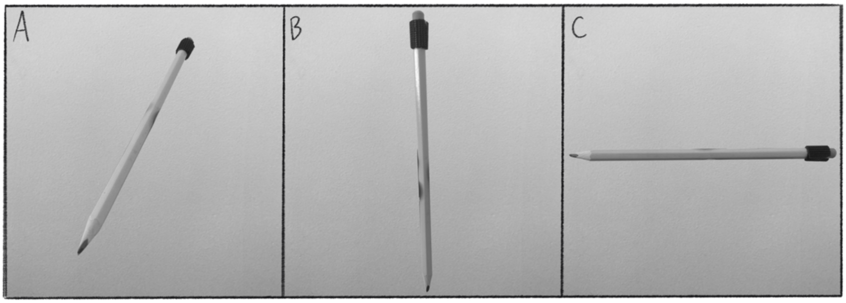


All of this information is conceptually true, but it doesn't translate to being visually true. To put it simply, you're drawing what you're thinking, not drawing what you're seeing.

However, as explained earlier, visual memory alone isn't reliable to draw from memory. The solution then is to not only draw what you see, but draw what you can feel. To rely instead on spatial intuition to recall object memory.

This is because the spatial recollection of objects is more accurate and easier to recall than mental imagery. It's what allows you to intuitively read the 3D form of objects you see every day.

To test this yourself, take a look at the following images of a pencil. Hold out your hand in front of you, and imagine you're about to grab it for each image (A - C).



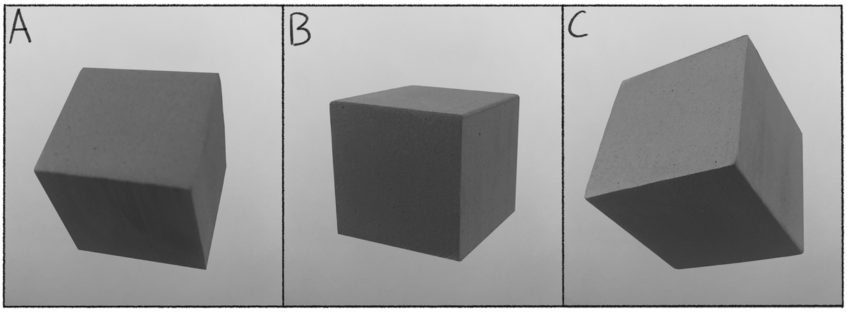
If your hands automatically adjust position for each rotation, that's evidence of your spatial intuition. Your sense of touch is closely connected to your 3D awareness of objects.

You already have an innate sense of an object's 3D form and how it would feel without even having it in your hand. The key is to use that exact intuition to draw objects from memory.

Superficial vs Spatial Perception:

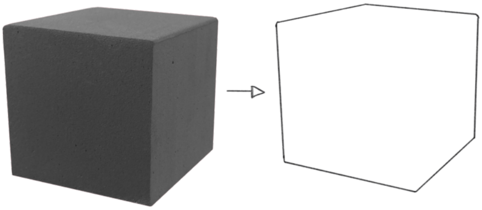
To demonstrate the full effect of integrating spatial sense into your drawing process, you are to perform a cube rotation task under two different modes of perception.

The following image shows a cube rotating between upward and downward angles. Take one look at it and study the contours of all 3 images.



For the first task you are to draw each cube rotation, but only it's outline (outer contour). None of it's internal contours or edges. Draw them from memory as best as you can and don't look at the reference images.

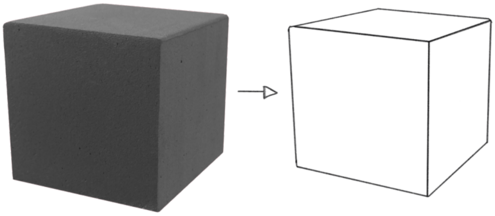
TASK.1



Upon completion, take note on your level of confidence drawing the cubes outline from memory.

Take a look at the cube images again and once more study all it's edges. For this second task, you are to draw each cube rotation except now including all it's edges, being the internal contours. Once again, draw them from memory without looking at the reference images, and take note of your level of confidence afterwards.

TASK.2



Most people notice the cube being easier to draw by including it's edges rather than purely attempting to draw it's outline. The perception of the cube changes from being a flat diamond to an actual 3D object in space.

It’s easier to draw the cube including it's edges because your strokes are derived from your immediate spatial intuition of the cubes 3D form.

When you’re forced to only draw the cube’s outline, you were largely reliant on mental imagery of the cube which is harder to recall from memory.

This demonstrates that in order to draw objects from imagination, you must be spatially aware of an objects 3D form and synchronize that intuition with every stroke you make.

Drawing purely from muscle memory, and mental imagery, without any spatial intuition, is impractical. Instead of drawing lines you see, draw edges you can feel.

This is the division between “superficial perception” and “spatial perception.” Superficial perception is looking at images as just lines and shapes to draw on paper. This is used when you draw alphabet letters and only interpret 2D relationships.

Spatial perception is interpreting how lines and shapes correspond to a real life 3D geometry, like when you tried to grab the previous pencil pictures or when you drew those cubes in space.

Those images were just three different rotations of a cube. Now imagine if you had to remember to draw every possible rotation of a cube?

Relying purely on superficial perception and muscle memory to draw is not practical because objects have an indefinite amount of possible rotations and geometry.

Superficially, the contours of objects would change exponentially. That would be like forcing yourself to memorize more than a million different alphabet letters just to draw a single object in every angle. This is why artists can still struggle to draw from memory even when they trace images a dozen times.

They're only activating their superficial sense, and attempting to solely rely on muscle memory which is inevitably prone to some error.

I'm not saying superficial perception is useless. After all, the PCS variables and muscle memory development are all factors I have stressed great significance of in the past chapters.

They lean heavily into a superficial perspective of drawing to help you increase memory of strokes, and more easily analyze drawings for mistakes.

The key to drawing from imagination is to combine both superficial and spatial perceptions together in your drawing processes.

Superficial perception helps manage your hand-eye coordination to draw more precise strokes on paper. Spatial perception helps manage your recollection of what exact strokes to draw from memory.

When you associate your spatial sense of objects with drawn strokes, you enable greater precision and greater ability to recall forms when drawing. But how exactly does one learn to synchronize spatial intuition of objects with the lines you draw?

The RFT Variables

The PCS variables define what elements to remember drawing from references. The RFT Variables define how to remember your references to redraw them on command.

RFT Variables (shorthand pronounced “Rift”) are the elements you must spatially perceive from references to strengthen and guide your muscle memory of strokes. RFT is an abbreviation for Rotation, Form, and Transformation.

The PCS variables and OSD focused on pure hand-eye coordination training. The RFT Variables are the next piece that allows “mind-hand-eye coordination”.

PCS Variables are the superficial elements you perceive during the drawing process. RFT Variables are the spatial elements you perceive during and *before* the drawing process.

Before you Formotion any object from reference, you must first acknowledge and perceive the RFT Variables which consist of the following:

1. The **R**otation of the object - How the object is turned relative to yourself.

2. The **F**orm of the object - The 3D geometry of the object.

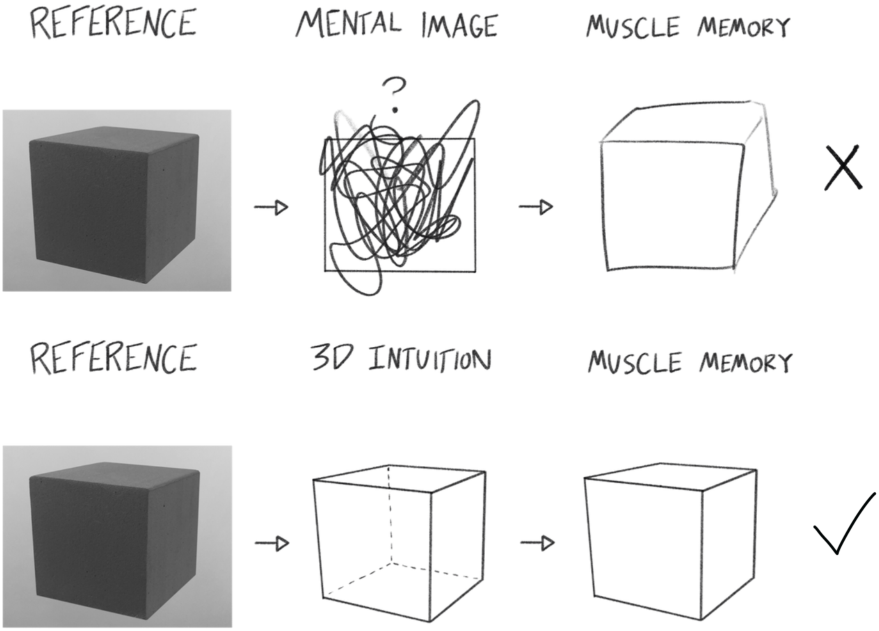
3. The **T**ransformation of the object - How the object’s geometry changes.

Objects change in view dramatically from just these three variables. As we have noted already, attempting to remember objects superficially is impractical, because object contours are too variable to remember from pure mental imagery.

Fortunately, you already perceive all three variables (Rotation, Form, Transformation) naturally thanks to your spatial intuition. It's what enabled you to perceive the rotating pencil images earlier, and imagine holding them in your hand.

All you have to do is sync your strokes with that same spatial intuition, as you did in the prior cube exercise.

So instead of drawing based on fuzzy mental imagery, you activate muscle memory based on spatial memory of objects.


REFERENCE
MENTAL IMAGE
MUSCLE MEMORY
?
X
REFERENCE
3D INTUITION
MUSCLE MEMORY
✓

It might be difficult to imagine a perfect picture of a cube in your mind. But if you were instead told to imagine what a cube feels like to hold and rotate in your hand, the memory is almost automatic.

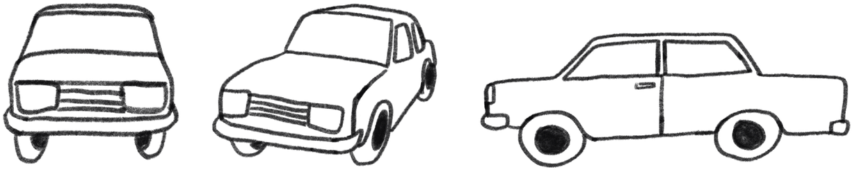
When your muscle memory follows that same spatial intuition, your of strokes become more immediate and accurate for any object.

Object Rotation & Reference Combination:

The rotation of objects are perceived as moving relative to your position in space. You naturally remember objects visually as if they were rotating in front of you, regardless if they were initially moving or not.

This is what's formally called an “egocentric frame of reference”(ex. That car turned to the left of me).

This contrasts with what’s known as an “allocentric frame of reference”, where object rotations are remembered relative to it's environment(ex. That car turned to the left of that street pole). For example, take a look at the following car doodles.



The different angles could come from the car rotating in front of you, or you moving around it.

Now close your eyes, and quickly try to remember the different angles of the car from memory.

When you attempt to remember the different car rotations, you'd most likely imagine the car as rotating in front of you (egocentric), rather than imagining yourself moving around it.

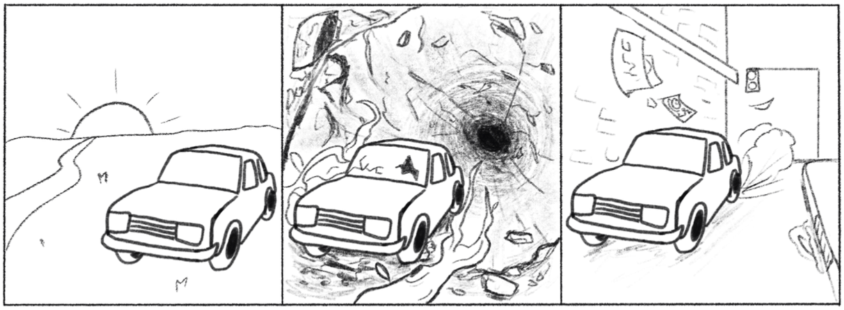
This egocentric memory of rotations applies to all other objects you see.

This sounds like a limitation, but it's actually a key advantage. By remembering different object perspectives as egocentric rotations, you separate objects from the original settings they were seen in.

This allows effective re-use of object rotations across different images. It's exactly how to combine studies of different references to make new perspectives.

You can see this demonstrated with one of the car doodle rotations being reused in different images on the next page.

From an allocentric view, the car can be seen from multiple angles. It is either located to the right, falling down a giant hole, or turning around a corner sharply.



But from an egocentric view, its easier to just see a single rotation of the car that is being re-used in different perspectives.

So when you perceive the Rotation of objects, you're just interpreting how an object is rotated in front of you; completely ignoring where it is located or rotated relative to it's environment.

This way, your memory of rotations are egocentric, and you can draw different perspectives using the same object rotations.

Object Form & Reference Limitations:

The form of objects refers to the spatial sense of an object's entire geometry: surface details, curves and any existing edges. It's what helps you recognize objects from touch without actually seeing them.

In other words, the perception of an object's form is connected to your sense of touch. This is why you changed your hand positions when looking to grab the pencil images in different views.

Your imagination of touching the pencil changed when the view of it changed. This is useful as it means for every object rotation, there is a unique touch sensation you can associate your strokes with.

You perceive the form of objects when you can imagine wrapping your fingers around the object. This makes your memory of strokes more immediate and strong.

It’s why in the previous exercise, drawing the cube with its internal edges was easier, because you could imagine touching its edges. Similar to what I said before, you’re not just drawing what you see, but also drawing what you can feel.

You are effectively replacing the image memory of drawings with the spatial memory of drawings. After all, it’s always easier to remember the touch of objects than to remember the scenery of objects.

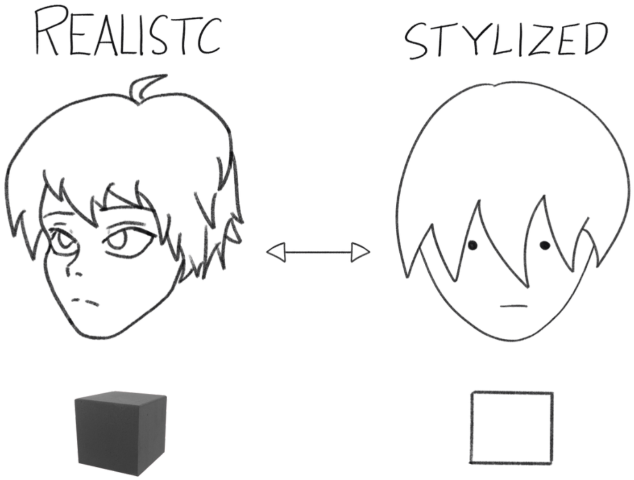
But memory of object forms only works when the references you use contain actual forms. The issue is that not all references have a form to interpret. This reveals an important order in which you should study different art styles.

Art styles where the human body is very abstract and cartoonish, may be harder to spatially interpret as stylized arts approach a near symbolic (superficial) relationship.

There isn't a form to interpret because the objects are purely 2D. The more cartoonish an art style, the less it corresponds to any real geometry to perceive or imagine touching anything.

In these cases, they are more spatially interpretable by the layout of its elements, or what you've come to know as the PCS of drawings.

Resultingly, remembering different 2D faces would be similar to remembering the different layouts of furniture in different rooms.



If an art style is grounded enough to possess real geometry (such as in anime faces), then you can just study the art style directly. A good rule of thumb: if an art style can be turned into a 3D model, you can likely interpret its form well enough to draw it with spatial intuition.

Object Transformation & Reference Variation:

The last component of the RFT variables is object transformation. This is about recognizing how an object's form changes across variations.

For example, instead of thinking "I'm drawing a leg", enhance your awareness to:

"I'm drawing a muscular leg, a skinny leg, a cartoon leg etc."

Recognizing variations of the same object allows you to be more precise in your spatial memory of forms.

This is especially important for drawing anatomy. While there is a general structure that represents most humans, there are still countless ways the human form can vary.

By distinguishing between different body types, and recognizing how form changes accordingly, you can draw with greater precision.

Object transformations also apply to how objects change under physics. Instead of thinking, "I'm drawing hair," think with more distinction:

"I'm drawing hair at rest, hair with wind blowing to the left, hair with wind blowing upward, etc."

This awareness of object transformation is especially needed when drawing clothes with different body movements.

In conclusion, before the first stroke of a pencil, you must perceive the RFT variables:

1. **R**otation: Imagine turning the object
2. **F**orm: Imagine touching the object.
3. **T**ransformation: Imagine how touching the object changes between its different variations.

With pre-emptive and active perception of object RFTs, you can remember to draw objects in any angle with confident spatial intuition and precision.

Chapter 4:
Correction & Extraction

At this point you have learned many specifics regarding the usage of references in learning to draw disciplined.

Firstly, that you must preemptively RFT categorize references before you Formotion them.

Secondly, every line must be drawn in clean motions following OSD.

And thirdly, that the muscle memory of objects can be formed through the repeated practice of Formotioning.

Formotioning is a core process apart of Disciplined Drawing, but it is most effective when accompanied by two extra steps we'll be covering in this chapter: One that calibrates your motions and one that corrects them.

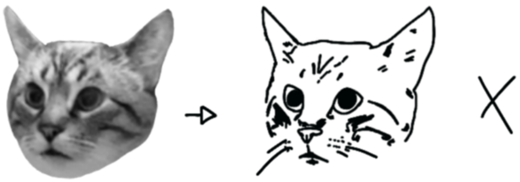
Edge Extraction:

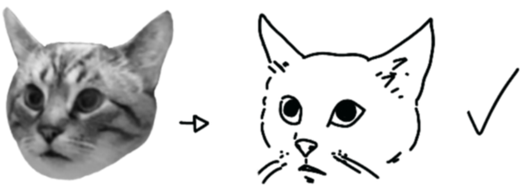
While you RFT categorize your references, and before you Formotion your references, it's best to also perform a process I like to call **Edge Extraction**: Tracing over your references to produce a clean line art version containing only the contours that imply its 3D form.

Edge Extraction is distinct from tracing, because it specifies to only trace the essential contours that make an object look 3D.

Most of the time, this means to negate the superficial elements of a form that aren't necessary to describing it's 3D nature.

For example, this can be the camouflage of a uniform, or the fur pattern of a cat. You can see this with the cat reference below. The fur pattern isn't necessary to evoking the 3D form of the cat head, so any of those lines can be negated.

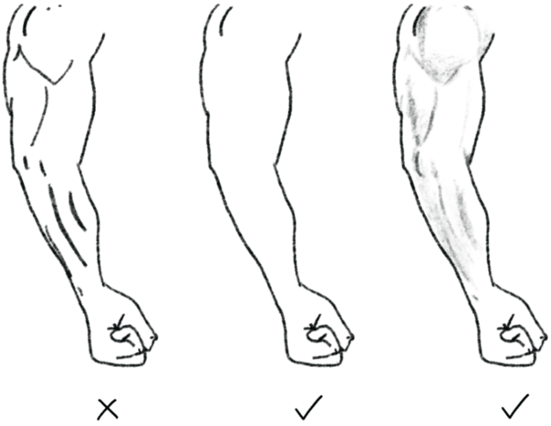




References that contain shaded values may not be implied through line art alone, and thus Edge Extraction can't be cleanly applied. If you're currently focused on just improving line art, then it is best to only practice with references where Edge Extraction can be cleanly applied without having to shade.

In my experience, the most useful references I have found to study from were those that contained cross contours or simplified constructions of the human body.

Otherwise, subtle values can still benefit the description of smoother forms and in these cases, shading is still optional. This is especially common in the drawing of anatomical body parts.



There are three reasons why we do Edge Extraction before Formotioning our references:

1. A clean line-art version of your reference makes it much easier to see the minimal contours you need to draw.

2. As you trace over your reference contours, you’re actively

sensing the exact hand motions to execute in your drawing attempts.

3. You force yourself to draw only the lines that trigger your spatial sensations, strengthening your memory of each drawing.

Its similar to the practice kids do when first learning to write letters. They traced over dashed line version of the alphabets before attempting to draw them freehand. You pre-calibrate and retain the hand motions needed before actively drawing.

Except in this case of drawing 3D objects, you're not just pre-calibrating hand motions, but also perceiving the spatial form of what you're drawing.

Every single line corresponds to an interpretable edge of an object, directly synchronizing your spatial sensations with every stroke you make.

This significantly improves your memory of objects you draw when you connect it to spatial activation. Its the same practice you applied with the cube exercise in chapter 3.

So Edge Extraction not only makes Formotioning easier by condensing it to minimal lines to copy, but it also prepares your motions, and ensures a direct connection between motor-spatial senses.

Overlay Correction:

Muscle memory formation does not distinguish between what is a correct/incorrect drawing. If you draw a single contour wrong repeatedly, your muscle memory may retain that error. In other words, your mind learns to draw what was repeated, regardless if it was wrong or not.

This is detrimental because as muscle memory is strengthened, the harder it is to forget it, leaving you with a stubborn memory of incorrect strokes distorting your next drawing attempts.

Even with adherence to OSD, the detection and correction of errors can still be difficult. Inevitably, you won't catch every mistake and small errors can compound into the entire drawing being flawed, still leaving you with uncertainty of what exactly to correct.

To resolve this issue entirely, you are to perform **Overlay Correction** after every Formotion session: detecting errors by directly comparing your drawing with a reference's contours by laying them on top of each other, and scaling them to be the same size.

Instead of figuring out why your drawing was wrong based on guesswork or outside judgment, you go directly to the source of what you were trying to accomplish, the reference itself.

If unsure of your Formotions accuracy, Overlay Correction can reveal any flaws in your own understanding of a reference's PCS. It enables self-critique of your own drawings based on how far off you were from the references used.

Continuous Overlay Correction forces you to repeatedly draw and improve the accuracy of your strokes each time. So not only are you strengthening your muscle memory, but refining it by systematically removing any flawed motions from memory.

You'll know you're improving when you can draw an image from memory with less re-attempts and greater accuracy over time.

To actually perform Overlay Correction, you'll use a phone, tablet, or any device with apps allowing you to upload photos, add layers, and decrease opacity (the degree to which an image is transparent). For mobile devices, I personally recommend the IbisPaint or Procreate app.

The directions are as follows:

1. First take a photo of your drawing that you suspect has an error

2. Upload the photo to your chosen app.

3. Upload the reference you used in the same app.

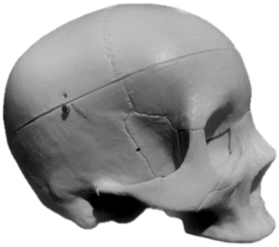
4. Overlay your drawing on top of your reference and align it to be the same scale, matching the contours where it makes most sense.

5. Decrease the opacity of either image so you'll be able to clearly see any differences between your drawing and the reference you used.

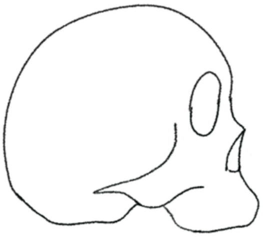
6. Optionally make your drawing attempt a different, brighter color to perceive errors more easily.

With this technique, any mistakes will become obvious by the mismatches between your overlaid drawing and the reference. You are specifically looking for any differences in PCS variables and taking note of any inaccuracies.

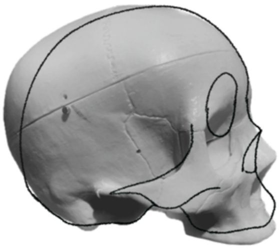
Once you understand what you did wrong, erase your mistakes and reattempt to draw where you committed the error, or redraw your entire reference, depending on your preference. I demonstrate this with a skull reference image.



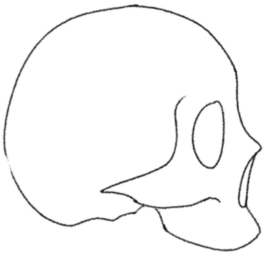
REFERENCE



ATTEMPT 1



REFERENCE

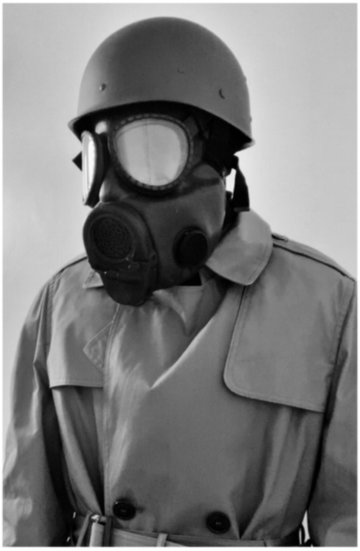


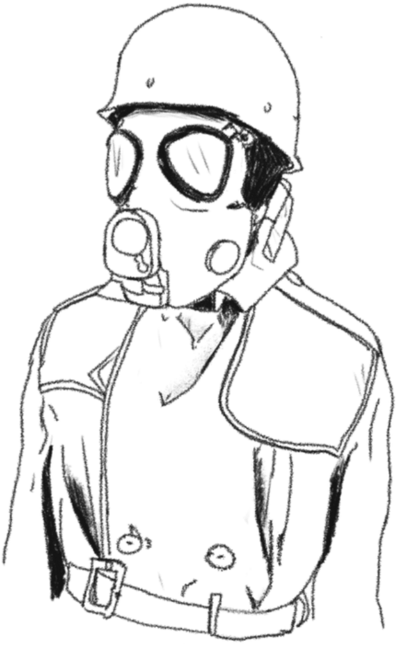
ATTEMPT 2

Here, I overlay my first attempt directly over the reference to become aware of my mistakes, and I then use that knowledge to refine my second attempt. I repeat this as many times as I need until I am satisfied with my degree of accuracy.

Case Study:

In this section, I will demonstrate a Formotion process with the additional steps of Edge Extraction and Overlay Correction, using a reference of a gas mask soldier. In the image below, you can see the exact photo of the soldier I attempted to draw.





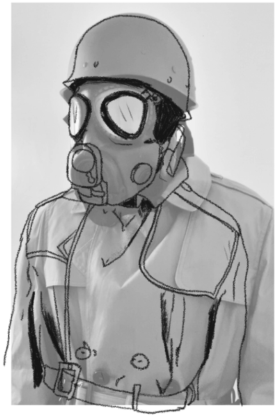
Notice that the size of my drawing is not the same exact size as the reference in view (known as sight-size). That's entirely fine as the objective is to simply capture the proportions of your reference accurately.

The exact scale or size of your drawing relative to the reference doesn’t matter, so long as the image remains recognizable.

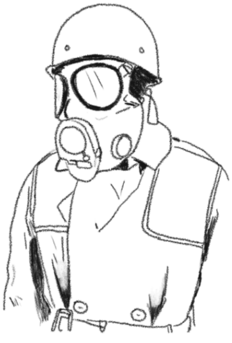
In my first attempt, I drew straight from the reference. At this point in time, I felt experienced in perceiving the RFT of references so I skipped Edge Extraction for now.

It wasn't that bad, however, I knew something about the angle of my drawing's face was wrong compared to the original reference.

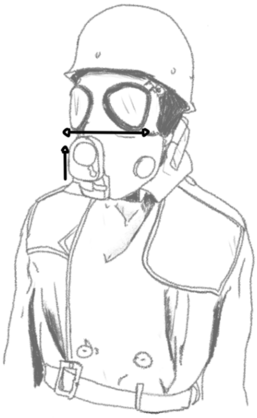
It still didn't capture the soldier looking upwards to my left, as much as I wanted. I wasn't sure exactly why mine seemed off, so I performed both Overlay Correction and Edge Extraction to find any differences.



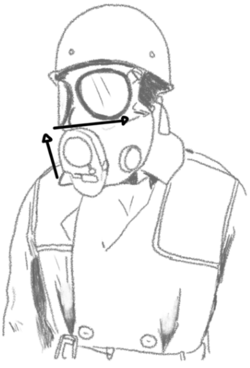
Overlay Correction



Extraction



Attempt 1



Extraction

When comparing my first attempt with the reference's Edge Extraction, I noticed a mismatch between the position of one eye and the mouthpiece, revealing a slight difference in the angle of elements.

Even though there were clear differences in the body between my drawing and the reference, I allowed them since they didn't affect my perception of the image.

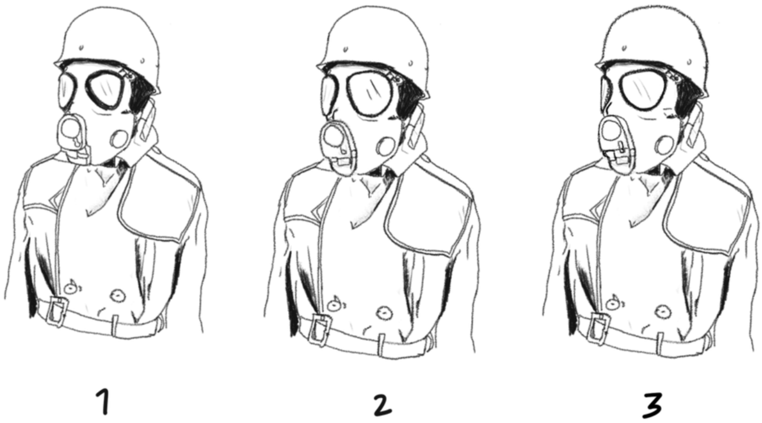
Recall that Formotion attempts are dependent on your own subjective judgment. You may think my drawing needs more refinement or not depending on your preference.

Continuing the process, I erased only the face and focused on redrawing it solely to look more like the reference. I erase only the face because that was the only inaccuracy I was dissatisfied with.

It's important to not only fix your mistakes, but preserve what you feel happy with. Muscle memory strengthens when you recognize and feel proud of the strokes you execute successfully.

It took me two more attempts of constantly referencing my past mistakes, and relying heavily now on the Edge Extraction reference. Through continuous Overlay Correction, I duplicated my flawed attempts to study them and guide my future hand motions.

I managed to draw the face to my satisfaction on my third attempt. You can see the evolution of my drawings in the image below.



You've now learned the general process of Formotioning. It's a constant loop of just drawing, and self-correction.

Using the same process, I would then continue to Formotion the same pose or other subjects until I reach a satisfying degree of accuracy and speed drawing them from memory.

Even the great legend Kim Jung Gi, who seemed to draw perfectly without ever erasing, emphasized the significance of repeated trial and error.

He once stated that in his earlier days, he would repeatedly draw and destroy his own art. He would do this until he was satisfied with how it looked, sometimes up to ten times or more.

So don't feel discouraged if your first attempts aren't successful, because even the strongest started rough in the beginning.

Additionally, moving on to a different reference or taking a break can avoid burnout. More importantly, your brain continues learning in the background even when you're not actively practicing. This is a phenomenon in neuroscience known as "offline consolidation".

The next time you give a reference another try, it might be easier than last time because your brain was literally rewiring without your conscious awareness.

It's the same reason people can ride a bicycle more easily after taking a day's break regardless if they succeed in their first attempt or not.

Chapter 5:
Psychological Regulation

The brain is a prediction machine. Whenever you perform an action, your brain will compare the difference between what you expected to happen versus what actually happened.

It’s how the brain guides and self-corrects your hand motions to draw more accurately. In simple terms, depending on whether you draw something as intended or were completely off, your dopamine levels actually surge or drop accordingly.

Dopamine is a brain chemical also known as the "feel-good chemical," and it’s what supports muscle memory development.

You essentially have an error minimization mechanic built into your brain that ensures you remember correct hand motions more via dopamine surges, and remember incorrect hand motions less via dopamine dips.

Dopamine Preservation:

A significant detail to know is that dopamine rewards are “expectation-sensitive”. If you take too long to complete a given task without any certainty of progress or reward, your dopamine response can weaken, and learning efficiency drops.

It’s not the time duration itself that matters but the amount of perceived successes during a task. It’s why pro artists can draw for hours without fatigue because successfully drawing every line causes dopamine surges to remain constant.

At the same time, if a task is too easy, then there isn’t anything to expect. Dopamine lowers and you don’t improve much past your current skill. Dopamine reward peaks when you succeed in completing a task where the expectation is uncertain.

Avoid practicing for hours without any success, but also avoid practice that feels too easy. You should always draw within a comfortable degree of difficulty.

The nature of dopamine reward is the reason so many artists struggle to learn drawing. Many stop drawing after one inaccuracy, and experience dopamine dip in the mind.

They become discouraged and don't bother trying to draw again (which is likely what happened to my 7yr old self).

Some artists force themselves to draw for long periods of time to finish difficult pieces in one go. They don’t realize their dopamine reward could be decreased, potentially weakening their muscle memory and causing small progression despite hours of practice.

But if you're starting out as a beginner, how does one learn to draw time-consuming and complex forms such as the entire human body? Does this mean it is impossible for a beginner to draw the same complex forms as a pro? Of course not.

Form Division:

In order to learn to draw more complex and larger forms efficiently while avoiding burnout, all we have to do is divide objects into smaller forms to draw. This is what I call **Form Division**, and there really isn't a limit to how much you can divide a form.

For example, learning to draw the human body can start with just learning to draw the human head, a race car, the front of a car, a city, a portion of the city, etc. You simply divide complex forms into more organized smaller forms.

Divide according to your skill level and drawing speed. For example, if even completing an entire head is too complex, first aim to just draw the face, and if not that, then you can focus on just drawing the eye.

By doing this, you shorten the amount of time it takes to complete a drawing, and manipulate the level of difficulty to finish it. This helps guarantee dopamine rewards and strengthens muscle memory for every practice session.

Only when you are able to draw one form to a satisfying degree would you then move on to drawing the next form. The rule is you only divide complex forms into meaningful and recognizable parts. Not just any random shape.

This will anchor your muscle memory to familiar structures. By learning to say, "I can draw the human head, leg, the eye, the mouth, etc...," you improve recall and organization of muscle memory for different objects that you can then later recombine.

Anchoring:

There is one caveat with Form Division, which is that relative proportions and connections between divided forms are not maintained if drawn in complete isolation from each other.

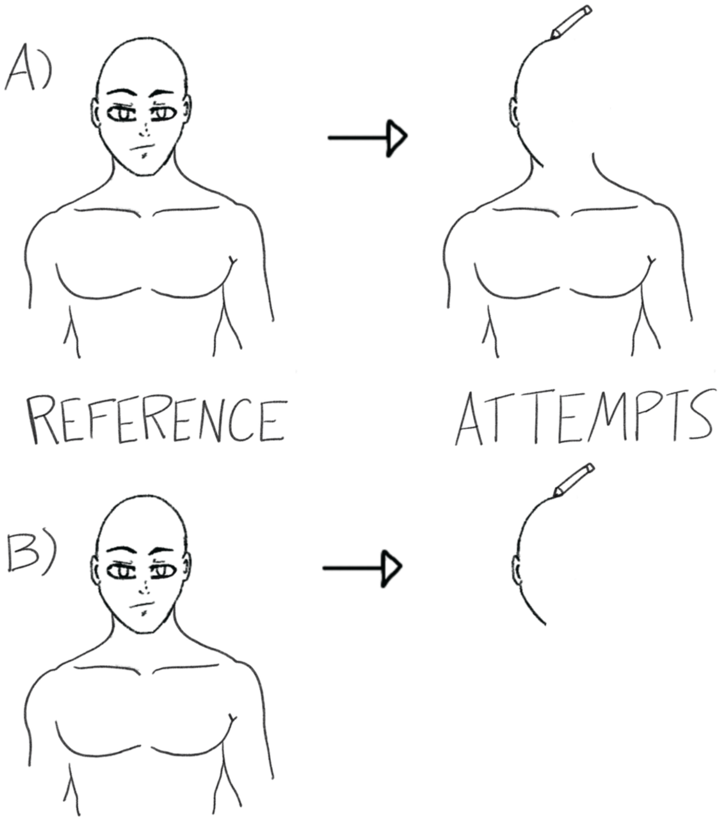
I had realized this early on when I became comfortable drawing the head, but when I attempted to draw it connected to the body, I recognized the head and body were completely disproportionate and unsynchronized. I had learned to draw the components individually, but not together in a single drawing.

The quickest and easiest solution was to perform Edge Extraction of my entire reference and erase only the part that I was focused on practicing. This way, I'm still only drawing one form at a time while perceiving its connections and proportions to other adjacent objects.

This is what I call **Anchoring** your drawn forms. You must always anchor your divided forms to adjacent forms that you wish to connect later.

For example, if I were only focused on learning to draw a head from a full-body reference, I would make a copy of it via Edge Extraction. I'd then erase the part I'm practicing (the reference head, in this case) so I can draw it connected to the body. Later on, when I want to draw the head and body together, I intuitively know how to draw them proportionate to each other.

You can see this demonstrated in part (A) of the image below, where I redraw the head on top of the duplicated body reference. If I were to draw the head unanchored, I'd be drawing it from reference without connecting it to anything, as shown in part (B).



To summarize, the general workflow would be drawing one form with anchors, and as you get progressively faster at drawing that one form, you can gradually move on to drawing more forms into a single practice session.

If you only care about drawing a single object, you can still draw it in complete isolation without anchoring it to any presumed pieces.

Chapter 6:
Drawing with Relativity

The word relative simply means "something in comparison to something else." For example, the size of a human relative to an ant is big. But the size of a human relative to the Eiffel Tower is very small.

In both cases, all we did was compare the size of a human to another object, and that's really the essence of what 'relative' means. Relativity is just the comparison between two or more things.

There are two ways to draw a reference.

1. Draw the sight size of a reference.

2. Draw the relative measurements of a reference.

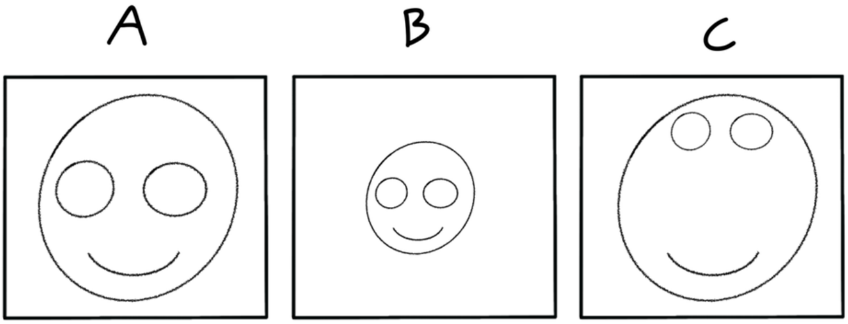
Our objective is to become proficient in drawing the relative measurements, or what’s simply known as the proportions of a reference. Not necessarily the sight size of references.

Sight-sizing is a technique where you draw your reference's elements the same exact size relative to your physical view of them. Drawing in proportions is when you draw your reference's elements relative to each other, regardless of their physical size relative to you.

Note that I am bending the technical meaning of the term "sight size" and instead using it to refer to the physical size of references.

Proportions are the reason you can have the same image recognizable even if you change its sight size (its physical size). For example, the same reference image will have a different sight size when viewed from your phone versus when viewed on a movie theater screen. However, the image remains identical because its proportions in both remain the same.

I demonstrate this in the next image.



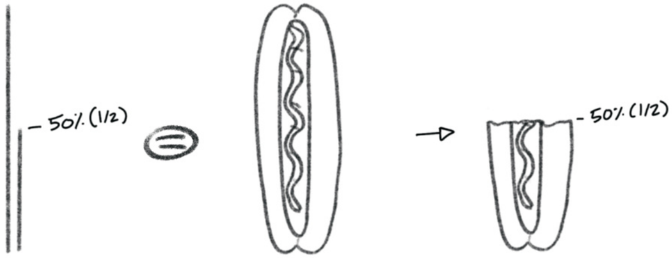
We have three different faces labeled A, B, and C. If you were asked which two faces were the same person, you'd most likely choose A and B.

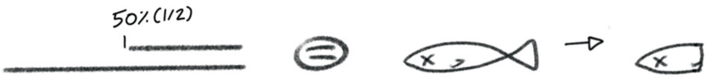
The proportions of their facial elements are exactly the same, making them appear identical despite being different sight sizes. Image C has the same sight size as image A, but has a proportionally different eye position than image A, which is what causes it to look so different.

This demonstrates the significance of drawing proportionally rather than matching the sight size of references. To train yourself to draw proportionally, make sure your references are either larger or smaller than your actual drawing attempt.

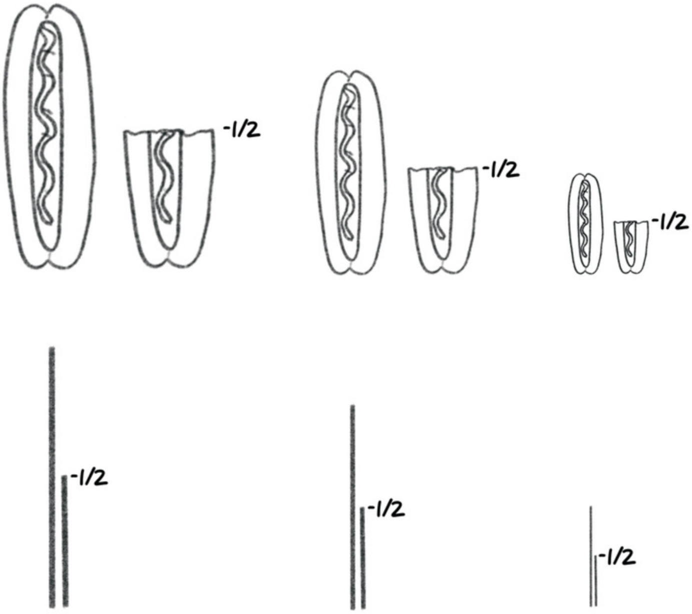
Relative Size :

Proportions are not anything new to you, and it’s something you've likely already been doing your entire life, such as the 1/2 proportion ("half proportion"). It is arguably the most recognized proportion in the world. It's often used to cut food in equal pieces.





To further demonstrate that proportions are maintained regardless of sight size, the next image shows three differently sized hot dogs. They all have different sight sizes, but the smaller hot dog paired with each one is still consistently half the size of the first hot dog.

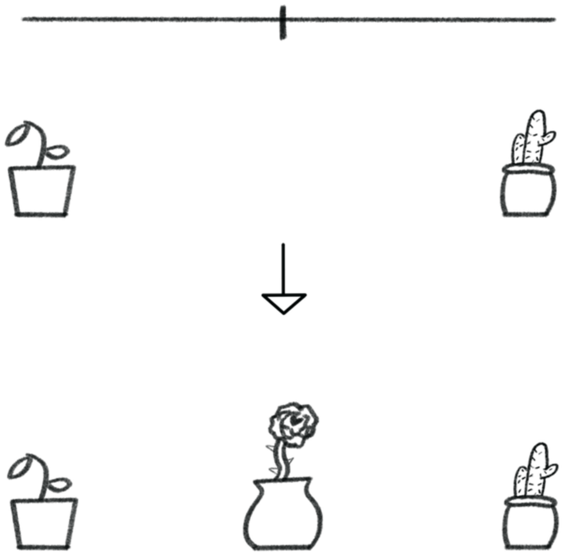


This demonstrates how relative size (size proportion) can remain constant regardless of changes in sight size.

Relative Position & Distance:

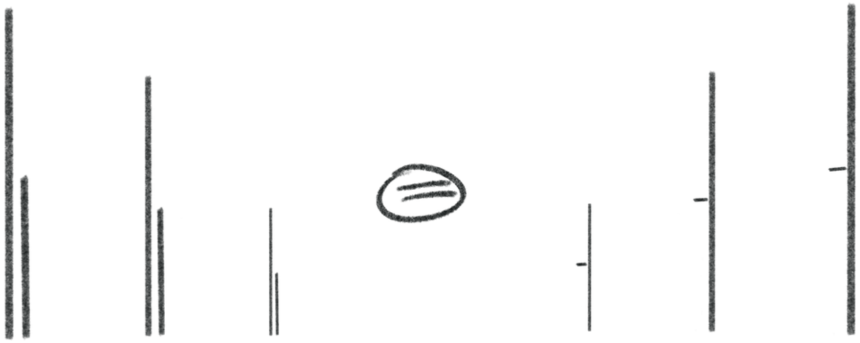
We were just comparing the relative size between elements, but it also underlies the relative positioning and distancing of elements. If you can make an element 1/2 the size relative to other elements, you can also position elements at exactly half-way of an element.

This is otherwise known as medial positioning, or “placing something in the middle,” which many people are also familiar with, such as when you reposition home décor (visible in the flower pot image below).

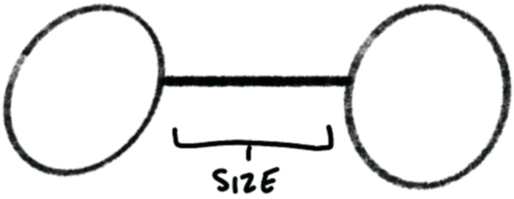


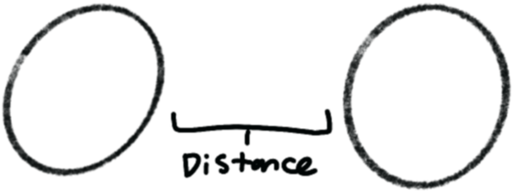
The conceptual equivalence between relative size and relative positioning is demonstrated on the next page.

On the left side we have relative sizing, and on the right side we have relative positioning, with the dashed line being positioned in the middle of each bigger line.



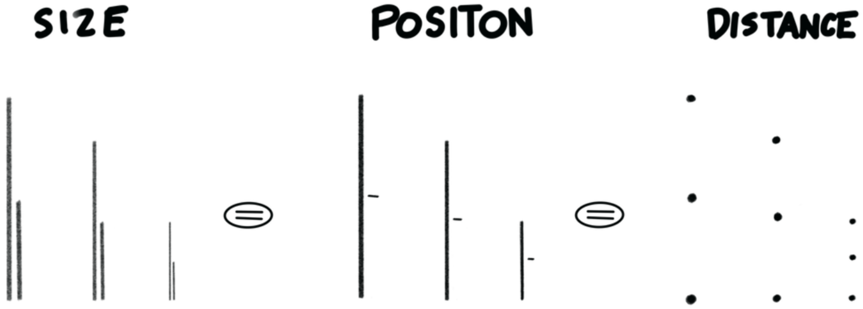
The relative distance between elements uses the same logic as maintaining the relative size between objects, except this time you are doing it for an invisible length. That's all distance is. Distance is just invisible space, while objects and lines are visible space.



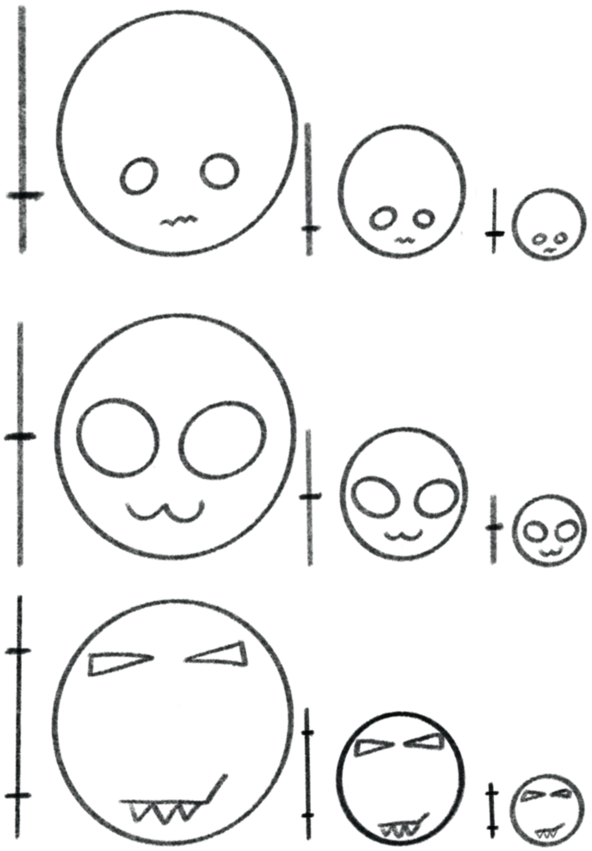


This is why distance is not explicitly mentioned in the PCS variables because conceptually, comparing the distance between objects is equivalent to just comparing the size between objects.

Similar to relative size and position, relative distance can also be maintained proportionally without regard to sight size. To conclude, if you can cut a hot dog in half, then you can innately perceive the relative proportions of size, position, and distance between elements for any given reference. Their conceptual equivalences are demonstrated below.

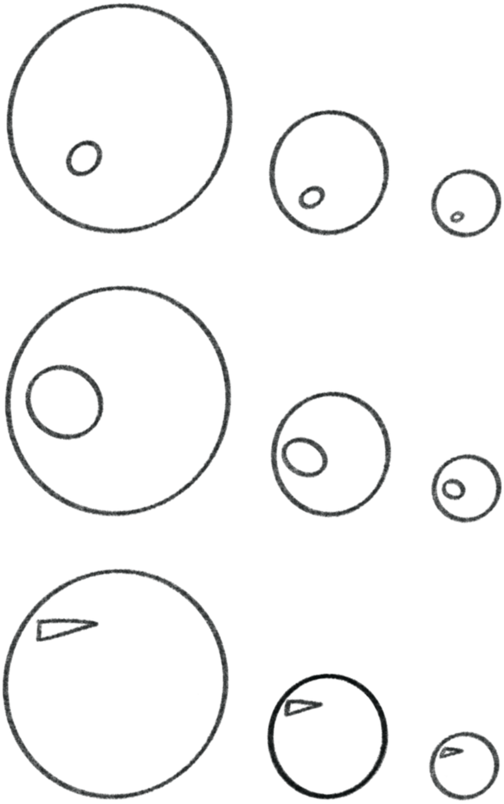


The perception of proportions is especially useful when you want to easily replicate the unique identity of different characters' faces in different sight sizes. You can see this demonstrated on the next page.

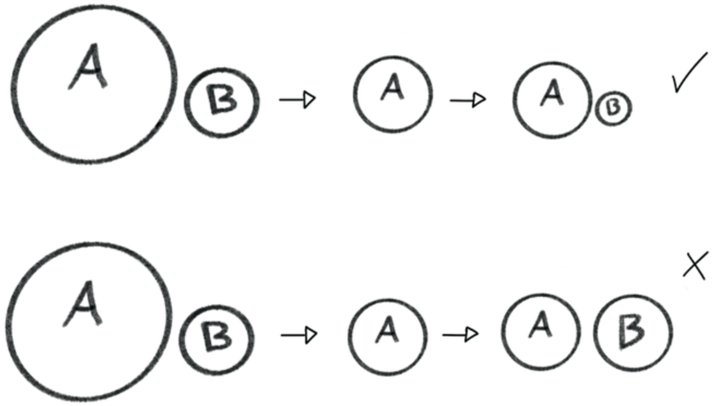


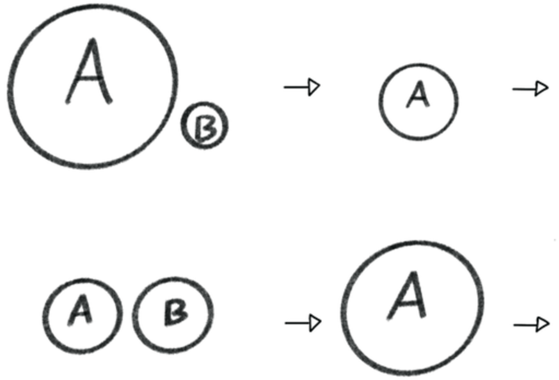
Do note that relative size is still distinct from relative position and distance in that it can also refer to the area size of elements, meaning how much visible space an element occupies within an image.

This was applied to draw the eyes proportionally in each of the prior faces. Notice that each head is the same size, but the eyes differ in area size relative to each head. This is how their unique identities are maintained despite all having the same head size, along with other proportionate differences.



You can practice this yourself by drawing circles in different relative area sizes. On the next page are some examples you can use, where you'll just be duplicating circle B in correct relative size to circle A.

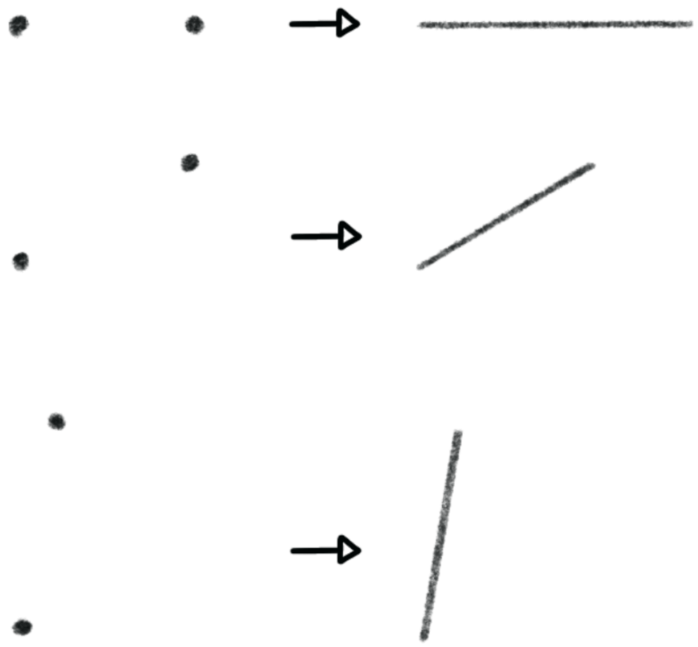




Relative Angles/Alignment:

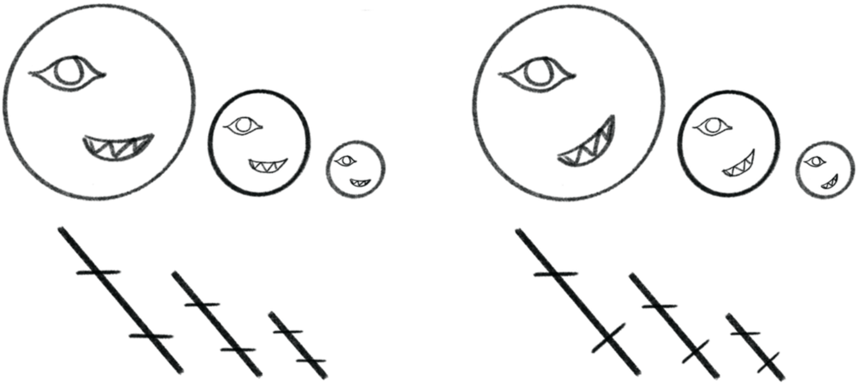
Proportions can also vary by relative angles. This includes angles that are horizontal, diagonal, or any other arbitrary degree.

Within the domain of Disciplined Drawing, angles can be defined as “the way two perceivable points align with each other relative to your view." This is why angles can also be known as "alignments". How good are you at aligning elements in space?



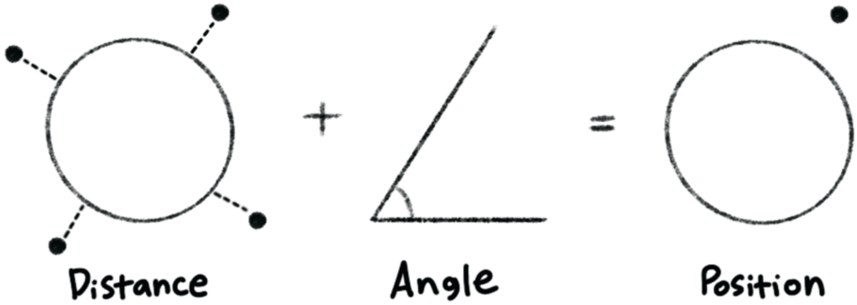
Angles are important to acknowledge because if you have the correct relative distance and size between elements, you still may not posses the same relative angle between them.

Even just one element being arranged at a different angle can have a strong visual effect. In the next image, you can see this with the slight change in angle of the face's mouthpiece, and how it creates a new look than the original.



Angles are not mentioned in the PCS framework because in an abstract sense, relative positioning is just the simultaneous maintenance of both the relative distance and angle between elements.

Relative Distance + Relative Angle = Relative Position



To conclude, what's important when drawing a reference is maintaining its proportions (relative measurements), not its sight size.

This is what'll allow you to flexibly analyze and draw any given reference of any given size.

So for example, if you have a reference on a laptop screen, you can decide to draw it on a whiteboard, a sketchbook, or even a napkin, knowing you only need to preserve its proportions, not sight size.

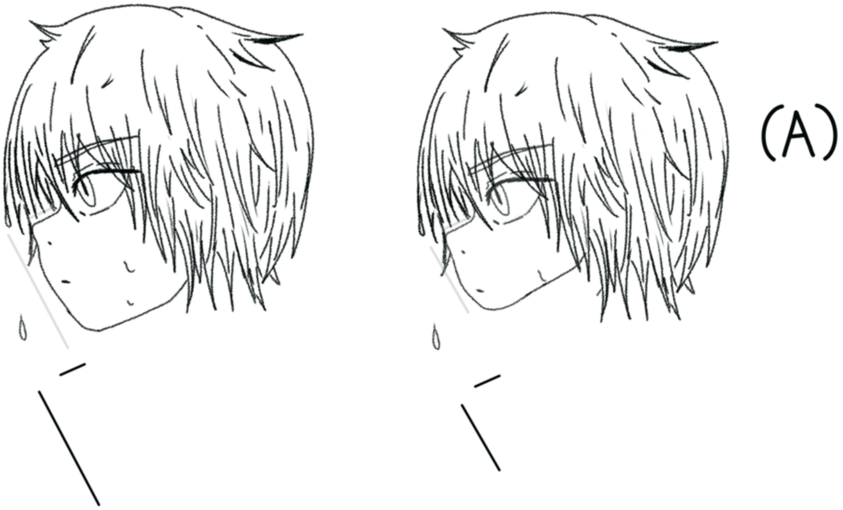
But how about the ability to draw specific contours? Drawing contours is more closely in tune with one’s own subconscious bodily actions, so it's less helpful to attempt to logically abstract it.

It'd be as helpful as trying to verbally teach a baby how to walk. To get better at bodily actions, you just have to make your body do the actions.

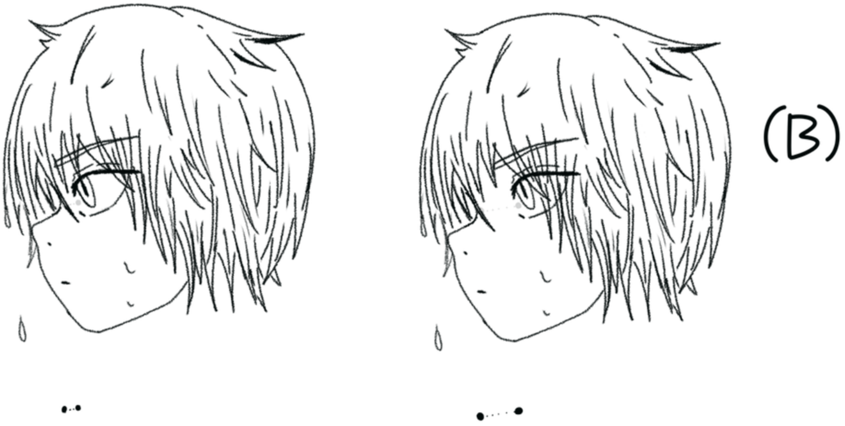
I will demonstrate the effects of relative measurements with a head reference, in which its appearance changes completely by changing just one variable at a time.

This is essentially another demonstration of the PCS variables, except now including distance and angle, while also directly comparing changes to the original reference. This is demonstrated on the next page.

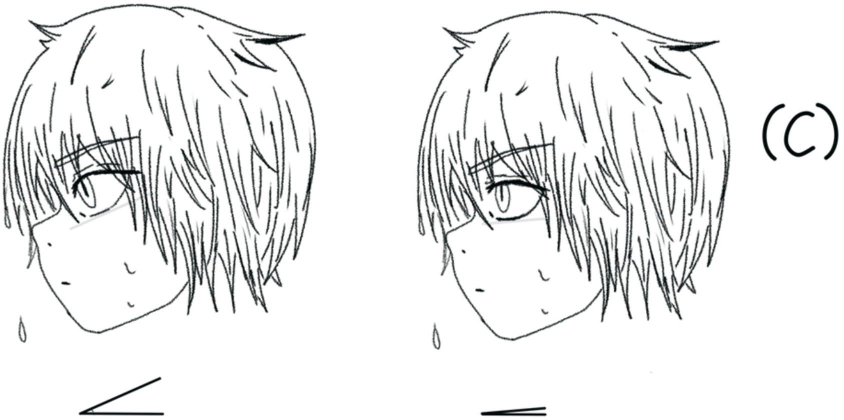
In part (A), the face is transformed by change in relative size of the nose-mouth contour.



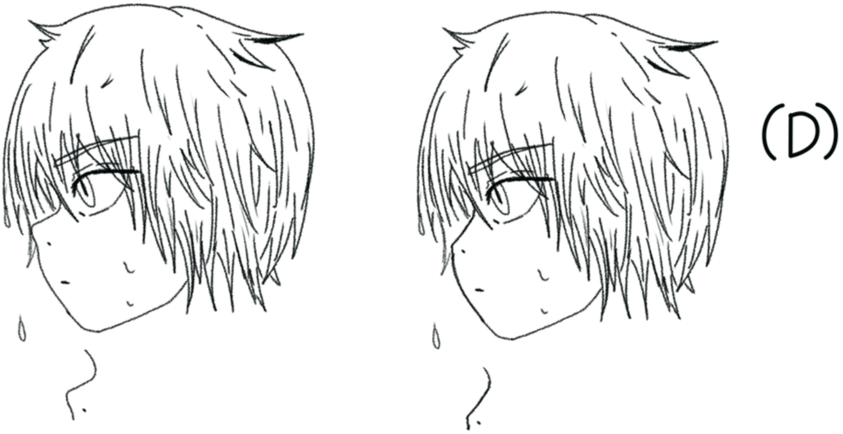
In part (B), the face is transformed by change in relative distance of the eye. You can technically say change in position as well, since they overlap in function.



In part (C), the face is transformed by change in angle of the eye, which makes the eye look more straight ahead compared to the original looking more down.



In part (D), the face is transformed by change in contour of the nose, nearly evoking an entirely different face.



All of these examples were isolated and minimal changes, but each one still caused a significant difference in the appearance of the face.

This is why it's crucial you are aware of a reference's proportions in order to fully coordinate and maneuver your strokes: calculating the relative size, distance, angle, and contours.

With the combined perception of relativity and the PCS variables, you have the necessary mental fortitude to draw any reference you see in any given size.

Chapter 7:
Psychological Manipulations

In this chapter, we’ll cover some specific patterns related to drawing the human subject, in which the rearrangement of PCS variables can evoke different effects on the mind.

Our perception of humanoid subjects is innately programmed to perceive them as youthful, mature, beautiful or cute etc. Anything drawn "humanoid" evokes these special characteristics not commonly applicable to other non-human objects unless they're strategically drawn with human features.

In this chapter, we'll be covering those innate triggers that control these perceptions, and some useful guides that will elevate your character design skills. As the humanoid subject is an essential to unlimited storytelling potential, learning about it can help you become fully flexible in artistic expression and imagination.

Facial Identity Preservation:

We will first cover one of the most important skills in character design which is the preservation of facial identity.

How does one preserve the identity of character’s faces? That is, how do you draw a character's face, and still have people recognize the same person you just drew?

Facial recognition is extremely sensitive to error. To make this task easier, it's best to know what is necessary to preserve facial identity when drawing.

Across all styles, facial identity is generally determined by the following elements:

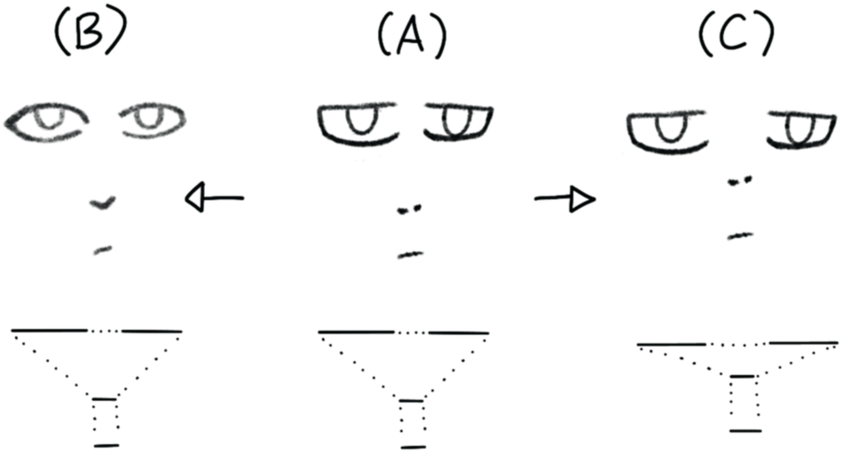
1. The contour of the eyes.

2. The contour of the nose.

3. The relative distance and size between the eyes, nose, and mouth.

As long as you maintain these elements, you can largely preserve the identity of any stylized face. Note that I did not explicitly mention the contour of the mouth.

This is because its a Variable Form that can change more frequently due to facial expressions. The effects of these variables are demonstrated on the next page.



Face (B) has the same element positions as face (A), but still looks like a different face because of the differences in eye and nose contour. Face (C) has the same contours as face (A), but due to differences in the position of facial elements, it still looks different than face (A). This demonstrates how change in just one of the facial identity variables, can produce a new look.

Concerning the preservation of realistic faces, things become more nuanced. Facial identity in realistic faces is inherently tied to any shaded values present. This is because they describe a more rigid geometry that is grounded in reality.

Shaded values are commonly void in stylized/cartoon faces, thus shading is not applicable. Shading is optional at this stage of purely building line control and muscle memory.

However, I found that the addition of the eyebrows and any visible hair are necessary to trigger facial basic facial recognition for realistic faces.

Facial Age Determination:

What makes a face youthful versus what makes a face old? For a single character, you might want to be able to draw them in different ages from childhood to adulthood. This is easily done with change in the proportion of facial elements.

The key determinants of facial age consist of the following:

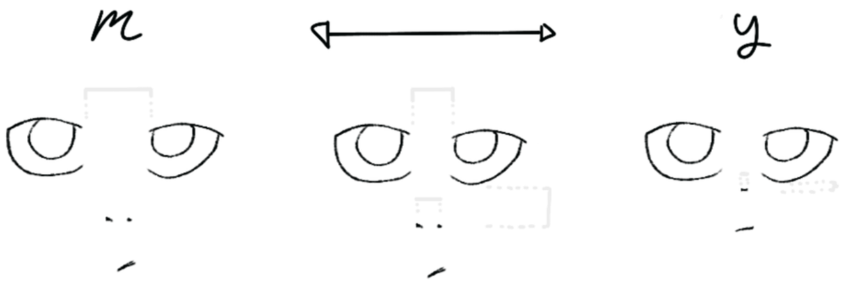
1. The distance between the two eyes.

2. The width of the nose (distance between two nostrils).

3. The distance between the nose and the eyes (lower eye lids).

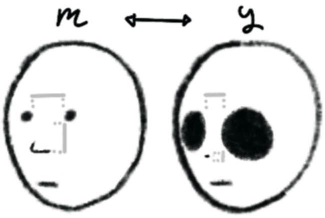
Note that when I say “nose”, I am only referring to the "nasal base" which consists of the two nostrils.

On the next image, the characters face can vary between youthful (Y) and mature (M), simply through the manipulation of the mentioned variables.



The face in the middle has an increased nose-eye distance and an increased nose width, which is what makes it appear older than the (Y) face on the far right.

The face on the far left (M), has the same nose-eye distance, and nose width as the middle face, but with an increased distance between the two eyes, makes it appear more mature than the other two.



This works because proportionately, adults have bigger noses than infants relative to their eyes. So when you decrease the distance between the nose and the eye, you are effectively making the nose smaller, mimicking infant proportions.

You further mimic youthful proportions by directly decreasing the width of the nose, evoked through a change in distance between the two nostrils.

Babies also technically have bigger eye-to-face size ratio than adults, but this is indirectly evoked with change in distance between the two eyes.

Anime stylization often follows the logic of infant facial ratios to make their characters simultaneously more attractive and cuter than realistic people. It's exactly what creates the clear distinction between realistic and anime-styled faces.

In real life humans, the distance between the eyes and the width of the nose (nasal base) are each roughly equal to the width of a single eye. This of course, is just a general approximation and can actually fluctuate amongst different people.

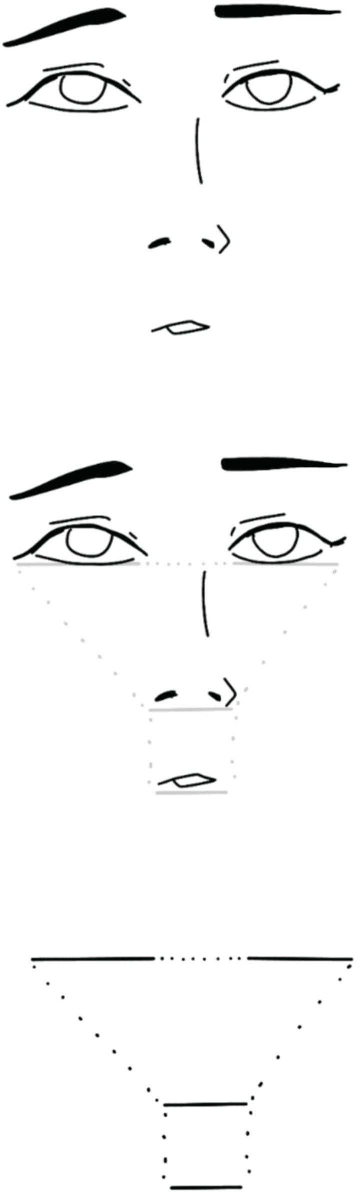
However, anime prioritizes cuteness to the extreme, and it commonly manipulates facial ratios to mirror infant ratios past realistic anatomical possibility; primarily minimizing the width of the nose, the distance between the eyes, and the distance between the nose and eyes.

You can see this on the next page between the contrast of face (A) and face (B).

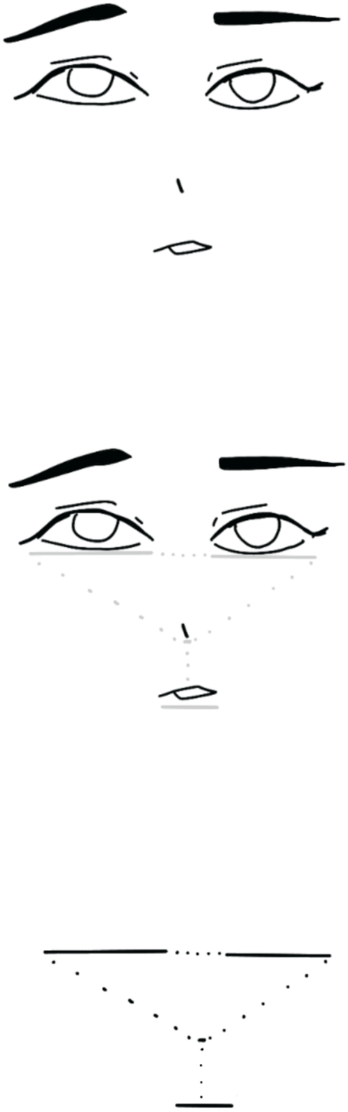
In the realistic face (A), the nose width, and distance between its eyes are similar in size to the width of a single eye, akin to more realistic facial proportions. It also has a greater distance between the eye (lower-eye lid) and nose (nostrils), directly evocating a longer nose.

The anime styled face (B), is literally just the inverse of these relationships. Where its nose width is reduced to a single line, and the distance between the eyes and the distance between the eye-nose are decreased.

(A)



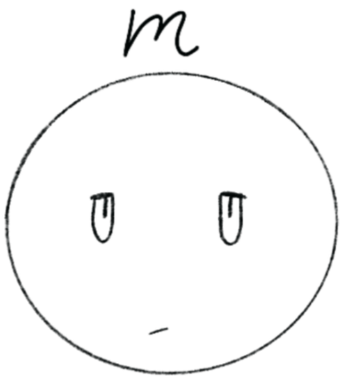
(B)

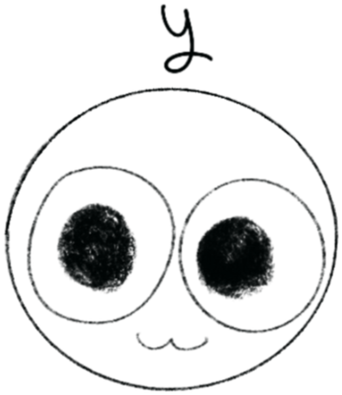


This follows the psychological concept of "supernormal stimuli." It's the idea that there are biological human instincts that can be triggered dramatically, a baby’s face being one of them.

The familiarity of infants and young children evokes the primal instinct of "cuteness" in humans, which drives the urge to nurse, protect, and care for something delicate.

You can abuse supernormal stimuli to the max to evoke even more cuteness. For example, by making eyes impossibly large relative to the face.





To summarize, facial-age is dependent on the following proportions:

1. The bigger the eyes relative to the face, the more youthful the face becomes.
The reverse is true.

2. The smaller the nose width (nasal base) relative to the eyes, the more youthful the face becomes.
The reverse is true.

3. The smaller the distance between the nose and eyes, the more youthful the face becomes. The reverse is true.

Eye-Identity Maintenance:

Eyes are probably one of the most significant determinants to the identity of a character's face. Due to their transformative nature (facial emotions, opening/closing eye-lids), it can be overwhelming at first to try to think about what to preserve in a character’s eye across different perspectives and expressions.

In order to maintain the identity of a character's eye, I recommend paying attention primarily to the corners of the eyes, formally known as the "canthi". The shape of an individual's eye varies greatly, but what stays most constant throughout facial expressions is the position of the canthi.

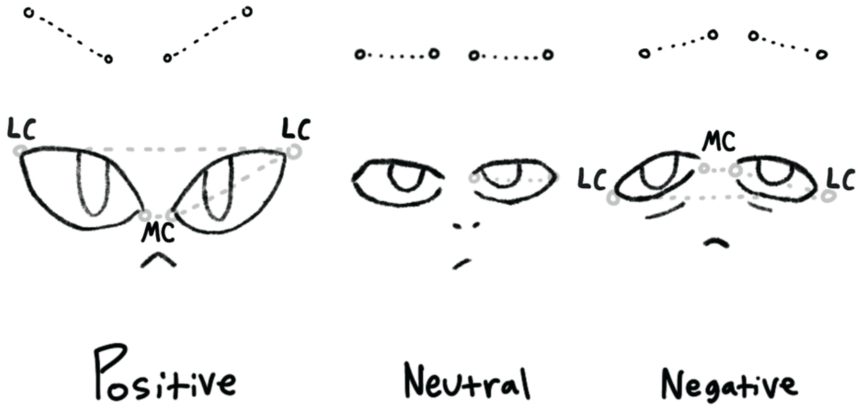
I will simply call them the "eye corners," or “corners”. Each eye has two corners:

1. Medial eye corner (MC) - The corner located closer to the nose.

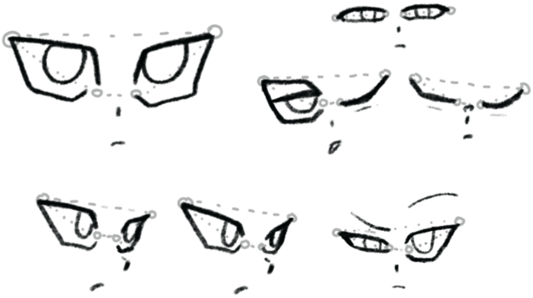
2. Lateral eye corner (LC) - The corner located opposite to MC, toward the ear.

Corresponding eye corners align in view: each lateral eye corner aligns with its opposite lateral, and each medial aligns with its opposite medial. Additionally, alternate eye corners (lateral versus medial) align at a unique angle that varies between individuals, known as the "canthal tilt."

The angle of the canthal tilt can be positive, negative, or neutral. This is one of the differentiating factors that determines the uniqueness of a person's eye.



These eye corners don’t shift significantly, and even in extreme expressions, they move in predictable ways. All you simply have to do is keep the eye corners and canthal angles aligned corresponding to a character’s emotion or perspective.



Body Percentage Model:

The age of an entire character's body is determined by the proportion of their body parts. To simultaneously maintain body proportions and efficiently control the implied age of characters, I devised the **Body Percentage Model (BPM)**: A framework that guides the length of body parts to help evoke different body ages in characters.

I developed it to help artists control body proportions with high precision via percentage ratios, and design their characters to appear more younger (Y) or older (M).

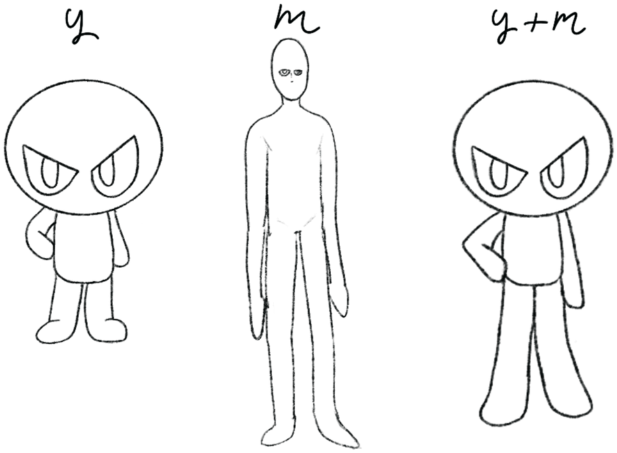
However, I found that they can be intimidating and even undesired by artists just starting out. As a result, you can still learn a generalization of the ratios by remembering these 3 simple rules summarizing the Body Percentage Model measurements:

1. The longer the limbs relative to the torso, the older the age. The reverse is true.

2. The bigger the head relative to the torso, the younger the age. The reverse is true.

3. Adjacent limbs (ex. forearm vs upper arm) are similar in size to their counterparts.

You can experiment with the ratios in any way you like, and freely deviate from the ratios I've established since they are only approximations. In the following image you can see the Body Percentage ratios exaggeratedly applied. The figure on the far right (Y+M) is a common ratio used by many character designers who seek to evoke both maturity and youthfulness simultaneously: combining a youthful head-to-torso ratio with mature limb-to-torso ratios. In other words, a small torso, but relatively bigger limbs and head.

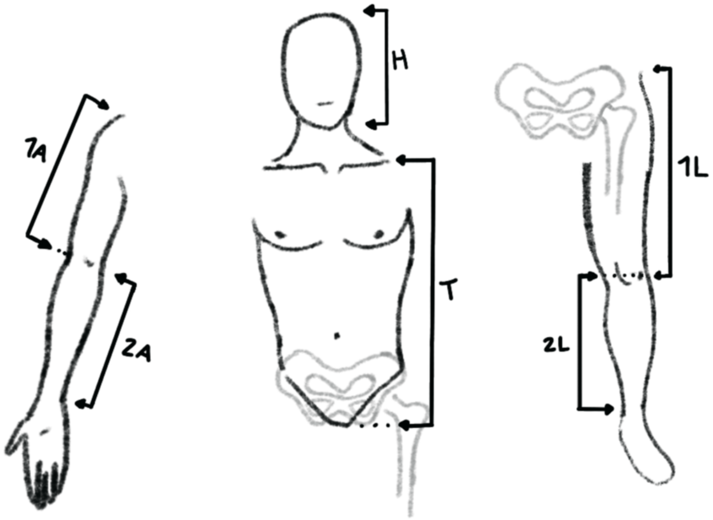


Now if you're curious and wanted to learn the exact measured ratios of the Body Percentage Model, you can continue on for the rest of this chapter.

The Body Percentage Model consists of abstract body lengths which act as placeholders, not as actual shapes you have to draw.

When you see a different sized lines, square arm or a circular head, these only exist to represent the length dimensions of body parts. Think of them more as invisible containers to fit actual body parts inside.

The Body Percentage components consist of the following:



Head (H) = Length starts from the top of the head to the chin of any character. This is symbolically represented by a circle.

1st Arm (1A) = Length starts from the top of the shoulders to the elbow pit, which refers to the visible crease where the arm flexes.

2nd Arm (2A) = Length starts from the elbow crease to the end of the wrist, right before the form of the hand.

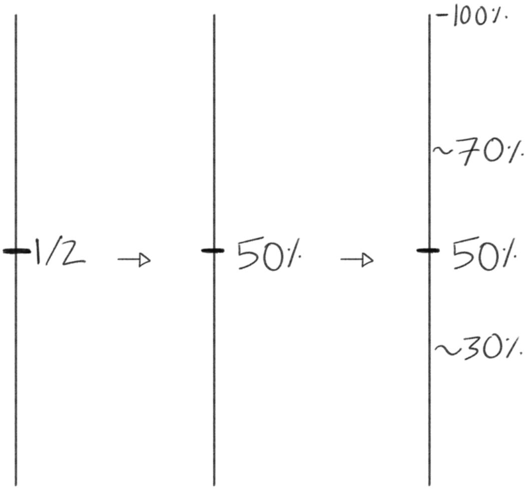
Torso (T) = Length starts from the top of the clavicles to the end of the pelvis, or right where the private parts begin. Note that the clavicles are the long bones connected to the shoulders, not the neck.

1st Leg (1L) = Length from the top of the hip bones (iliac crest), and ends at the middle of the kneecaps, or otherwise known as the knee pit. It's the line crease right behind the kneecaps where the leg bends.

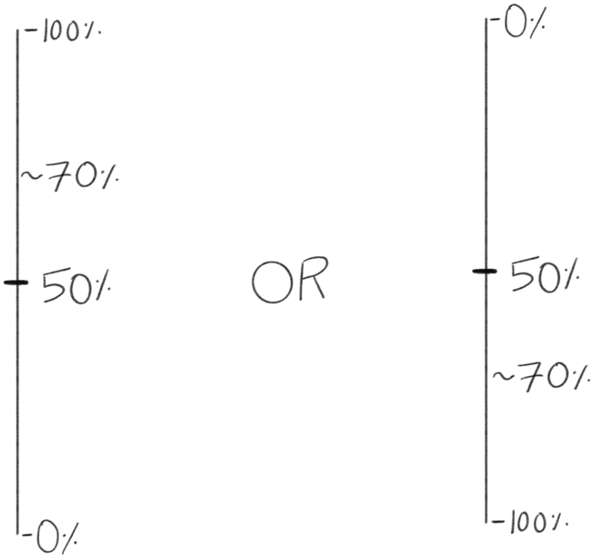
2nd Leg (2L) = Length starts from the knee pit and ends right before the form of the foot.

The Body Percentage Model uses percentage ratios, because I believed them to be more intuitive than fractional ratios.

The number 50% is equivalent to 1/2, so any other percentage value such as 70% or 30%, can be derived from first imagining the half of any length, and adjusting accordingly.



Do note that length measurements don't solely align with a bottom-up orientation, as seen in the next image where a top-down orientation is also possible.



Common body proportions solely use the head as a reference for measurement. The Body Percentage Model allows comparison between adjacent body parts to allow quicker estimation of lengths.

This avoids the pain of having to draw a bunch of heads to gauge correct proportions. For example, if you wanted to draw the arm in proportion, you'd just compare it to the torso length right next to it. If you wanted to draw the torso in proportion, you'd just compare it to the head length on top of it.

Body Percentage proportions are written as conditional statements, dependent on inequalities. Each expression is either approaching two values: young (Y) or mature (M).

To put it simply, I organized the body proportions to allow you to control whether you want your character's age appear younger (Y) or older (M). By the principle of supernormal stimuli, the younger in appearance a character is, the more cuteness they can possibly evoke.

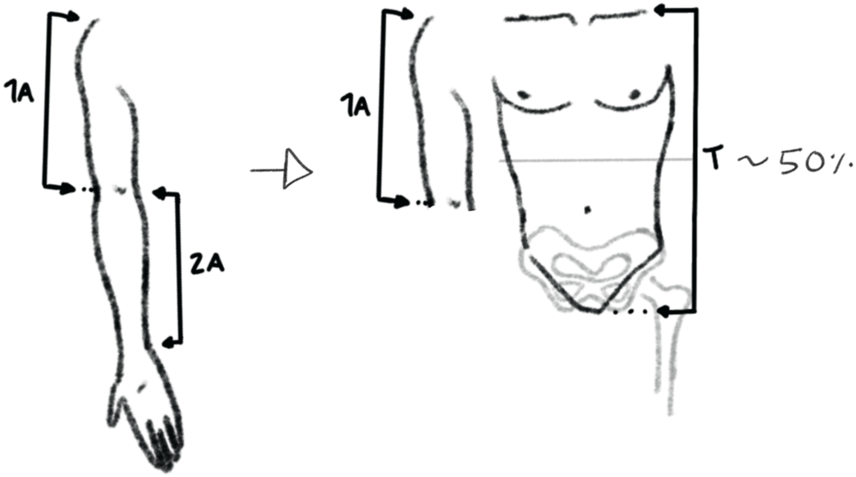
Note that these proportions are highly approximate, and are just averages to simplify human body creation. You're free to deviate from such ratios at will. I have written them both in normal language, and inequality notation for upmost clarity. The Body Percentage proportions are as follows:

If 1A is greater than 50% (1/2) of the length of T, then you approach a mature age.

$$1A > T\ (50\%) \Rightarrow M$$

If 1A less than or equal to 50% (1/2) of the length of T, then you approach a young age or any age.

$$1A \leqslant T\ (50\%) \Rightarrow \text{ANY or Y}$$



If H is less than or equal to 50% (1/2) of the length of T, then you approach a mature age.

OR

If T is equal to the length of two H's, then you approach a mature age.

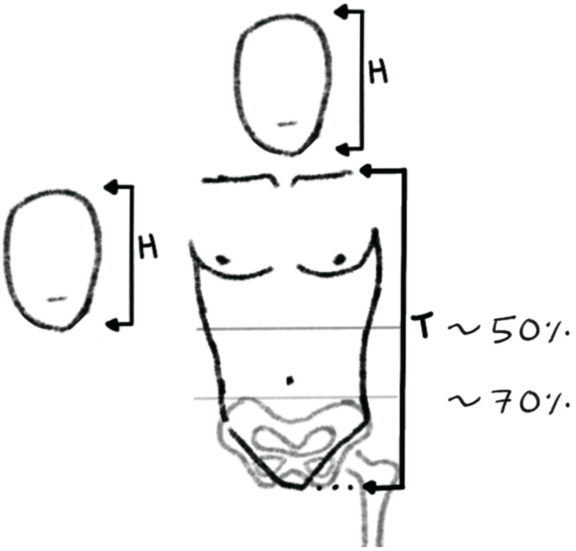
$$H \leqslant T\ (50\%) \Rightarrow M \text{ OR } (T = 2\ H) \Rightarrow M$$

If H is greater than or equal to 70% of the length of T, then you approach a young age.

OR

If T is equal to the length of H, then you approach a young age.

$$H \geqslant T\ (70\%) \Rightarrow Y \text{ OR } (T = H) \Rightarrow Y$$

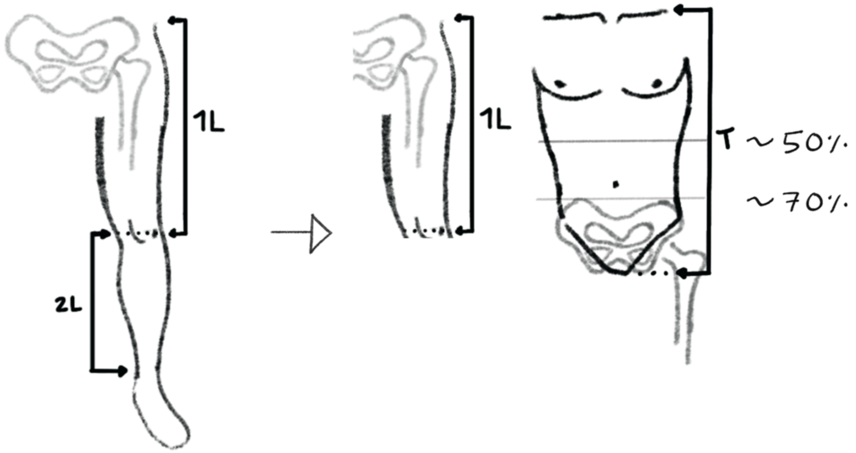


If 1L is greater than or equal to the length of T, then you approach a mature age.

$$1L \geqslant T \Rightarrow M$$

If 1L is less than or equal to 70% of the length of T, then you approach a young age.

$$1L \leqslant T\ (70\%) \Rightarrow Y$$



The ratio of adjacent limbs (1A/2A, 1L/2L) are not that significant, because I have found adjacent limbs to be similar to each other in size for most ages. The precise approximations for them are as follows:

1A is equivalent to the size of 2A, or minimally 2A is equivalent to 70% of 1A length

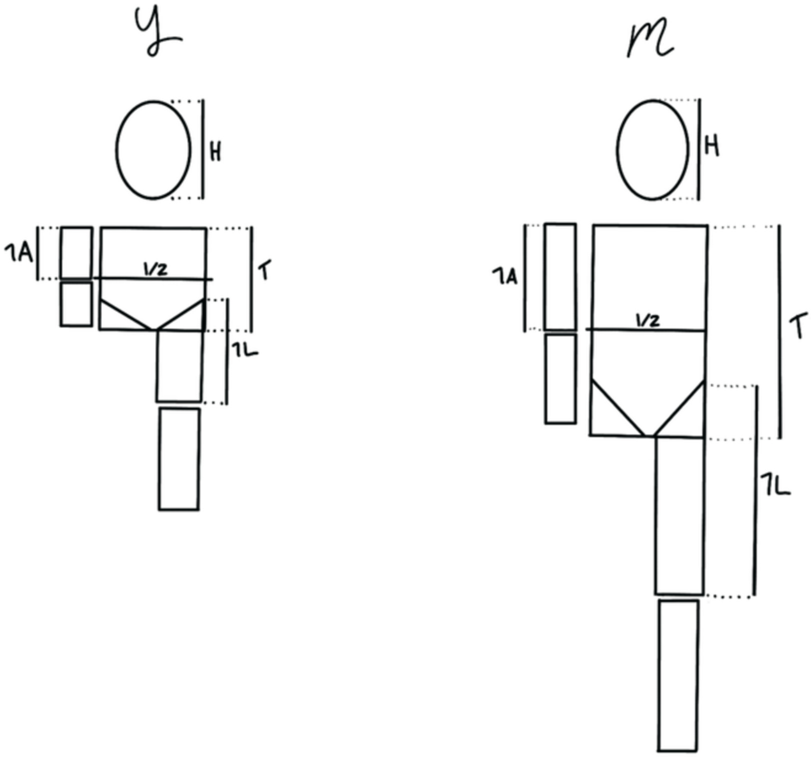
$$1A = 2A \text{ OR MIN } 2A = 1A\ (70\%)$$

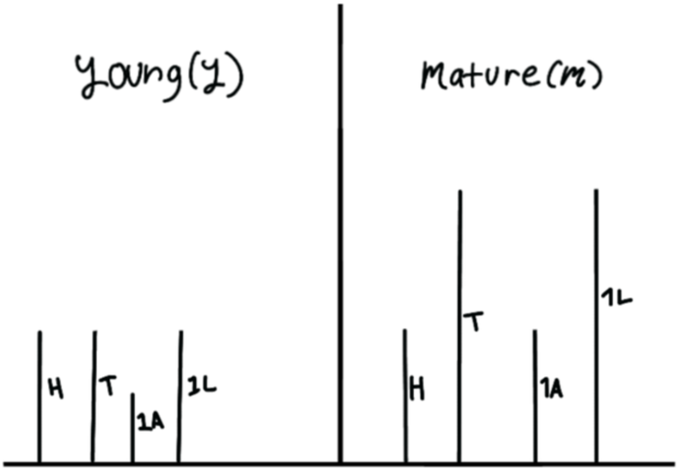
2L is equivalent to 70% of 1L length, or minimally 2L is equivalent to 50% of 1L length

2L = 1L (70%) OR MIN 2L = 1L (50%)

On the next page, you can see the Body Percentage Model proportions fully fleshed out, with the (Y) and (M) ratios at their standard values. Any other body proportions can be derived by playing around with the Body Percentage inequalities at your will.

Otherwise, if you wanted a definitively older-looking character, you simply match all body ratios approaching mature proportions. If you wanted a definitively younger looking character, you just have to match the length of all body ratios approaching a young age.


Y
H
1A
1/2
T
1L
M
H
1A
1/2
T
1L


Young(Y)
Mature(M)
H
T
1A
1L
H
T
1A
1L

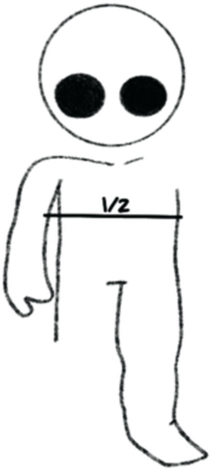
Note that the Body Percentage Model does not cover any width relationship of the body parts, since they are not as fixed relative to age. It's why chubby babies and skinny adults can exist at the same time, and vice versa.

An important one to know is that the width of a youthful head (H) is about the same width as, or greater than, the torso (T).

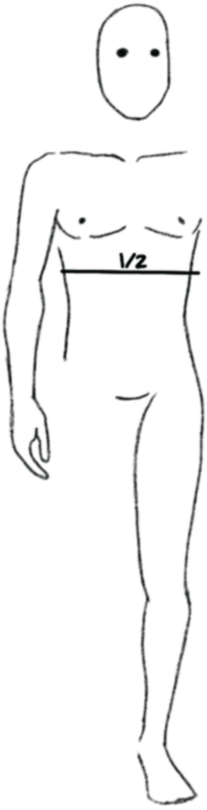
As an individual reaches a mature age, the torso width increases beyond the width of the head. You can see the width differences between the two ages on the next page.

To summarize: the younger the character, the greater the head (H) width is relative to the torso (T) width. The older the character, the smaller the head (H) width is relative to the torso (T) width.

y



m



Chapter 8:
Final Notes

You've reached the final chapter of this book. I know this chapter says the end, but it's really just the beginning of a new chapter in your drawing journey.

You are now equipped with the tools and knowledge to learn to draw intuitively and confidently. Don’t worry if you didn’t remember everything. Here’s a condensed version of the concepts to follow:

1. To remember your strokes, follow OSD.

2. To remember how to draw forms, Formotion.

3. To correct mistakes, get the PCS right.

4. To remember your drawings, perceive the RFT.

5. To draw strategically, divide and anchor references.

6. To draw proportionately, draw with relativity.

7. To draw characters, build with BPM.

You have now leveled up to an artist with the clear knowledge of what drawing really is. To distinguish between the 2D interface of strokes, the 3D intuition of the mind, and the psychological mechanics that bind them together.

You have the strategy. Now all you need is the experience.

Whether you learned to write or ride a bicycle, only through countless failures did you gain intuition.

You achieved confidence through repetition, not perfection.

Now it’s time to do the same with drawing. The objects you’ve always wanted to draw through hours of hesitancy can now be drawn through strokes of instinct.